





## Lectures on Practical Mining in Germany.

## CLAUSTHAL MINING SCHOOL NOTES.\*—No. XCIX.

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The publication of these Lectures is unavoidably suspended for two or three weeks. They will then be resumed and continued regularly.

\* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergschaffner, Director of the Royal Bergakademie, Clausthal, The Harz, North Germany.

## GEOLOGICAL SOCIETY OF LONDON.

Dec. 4.—HENRY CLIFTON SORBY, F.R.S. (President), in the chair.

Rev. W. H. Allen, F.R.S., Kentish Town-road; George Grey Butler, Civil Service Commission, Westminster; John Dixon, Assoc. Inst. C.E., the Choubr, Surbiton; Rev. Wm. Downes, B.A., Kentisbeare, Col-lumpton, Devonshire; Jos. Drew, M.D., Foxgrove-road, Beckenham; A. Tom Metcalfe, East Retford, Nottinghamshire; E. P. Monckton, M.A., Fineshade Abbey, Northamptonshire; Albert J. Mott, Adsett Court, Westbury-on-Severn; Philip Lutley Selater, Ph.D., F.R.S., Hanover-square; William Hobbs Shrubsole, Sheerness; and Alex. Thuey, Stenage, Herts, of the Public Works Department, Calcutta, were elected Fellows of the Society.—Charles Barrington Brown, Assoc. R.S.M., Lansdowne-road, Notting Hill; Carl Fischer, M.D., F.L.S., Sydney; and William Coles Paget Medleyot, Ven. Sherborne, Dorsetshire, were proposed as Fellows; and Dr. F. V. Hayden, Washington; and M. Jules Marcou, Salins, as Foreign Members of the Society.—Rev. Fred. Charles Lambert, B.A., Arundel House, West Hill, Sydenham; Robt. Plant, Cheadle Park, Cheadle, Stafford-shire; and Ernest Swain, Campden Hill-road, will be balloted for as Fellows of the Society.

The following communications were read:—

- 1.—“On some Mica-traps from the Kendal and Sedburgh Districts,” by Prof. T. G. Bonney, M.A., F.R.S., F.G.S., and F. T. S. Houghton, B.A.
  - 2.—“Pleistocene Notes on the Cornish Coast near Padstow,” by Prof. W. A. E. Ussher, F.G.S.
  - 3.—“The Pleistocene History of Cornwall,” by W. A. E. Ussher.
- The next meeting of the society will be held on Dec. 18, when the following papers will be read:—1. “On remains of Mastodon and other Vertebrata of the Miocene Beds of the Maltese Islands,” by Prof. A. Leith Adams, M.D., F.R.S., F.G.S.—2. “Dinosauria of the Cam-bridge Greensand” (parts 1-6), by Prof. H. G. Seeley, F.L.S., F.G.S.

## SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE INSTITUTE OF MINING ENGINEERS.

The quarterly meeting of members was held on Thursday at the Midland Institute, Birmingham.—Mr. Henry Johnson (vice-president) in the chair. There were also present, among others, Messrs. Jno. Field, Parton, D. Peacock, Hayward, Addenbrooke, Fellows, Rogers, G. Jones, G. Taylor, Tomson, Whitehouse, Davis, Broughall, &c.—The formal business being done, Mr. Field proposed a vote of condolence with the family of Mr. Barker, a member of the institute, who was killed in the lamentable accident at Sandwell.—The vice-president said he deeply regretted to say that Mr. Garside, a partner of the other gentleman killed by the same accident, had died it was thought from shock to the system caused by seeing Mr. Arnold fall.—Messrs. D. Peacock and W. North were appointed scrutineers at the coming election for officers. Messrs. Hayward and D. Rogers were appointed auditors.—Mr. Robinson (Walsall) introduced and explained a set of colliery report books designed to provide a continuous and undisturbed report at each pit, and also complete reports at the office of the colliery. He said his books were in counterfoil, so that every day the manager could have a report, and when the Government Inspector called there was no need to waste time in running from pit to office or from both to the manager. The competent person filled up both, and so the books were kept clean, and, according to the words of the Act of Parliament, “signed by the competent person.” Mr. Davis called attention to the new Weights and Measures Act, and said that, whilst the 19th section of the Act seemed to provide that every load of coal should be exactly weighed either below ground or on the bank, yet the 22nd section seemed to provide that the seller should not be liable to a fine if the articles were sold in vessels having no imperial qualification or size. The two sections seemed to show that if the 22nd applied to coal the old system of gauging could be continued without fear of prosecution. A discussion followed this, but the general feeling was that no good could come from the Institute resolutions until it was known how the Coalmasters' Association intended to deal with the matter. The discussion was adjourned for a fortnight.—Mr. David Peacock called the attention of the meeting to the lamentable accident at Sandwell, and said the sympathy of the institute should be with Mr. Johnson, who, with his son, had done everything to make Sandwell the foremost pit in the country. That such an accident should happen at Sandwell was inexplicable, and Mr. Johnson deserves that encouragement from his friends. Mr. Johnson, jun., ought also to be complimented on the risk he ran in venturing his life to save another.—Mr. Alex. Smith (M.I.C.E.), secretary, bore out the remarks made as to the perfectness of the plant at Sandwell, and bore testimony to the care exercised by Mr. Johnson and his son.—The vote of sympathy was then carried unanimously, and Mr. Johnson feelingly returned thanks.—A discussion on “Explosions from Dust” was adjourned, in consequence of Mr. Williams's experiments being in course of investigation.

**SOCIETY OF ENGINEERS.**—At the twenty-fourth annual general meeting of members on Monday (Mr. Robert P. Spice, President, in the chair), the following gentlemen were balloted for and duly elected as the council and officers of the society for the year 1879:—As President (for the second time), Mr. R. P. Spice; as Vice Presidents, Mr. J. Bernays, Mr. C. Horsley, Mr. T. Porter; as other members of the council, Mr. C. Barnard, Mr. J. Church, Mr. S. Cutler, Mr. F. E. Duckham, Mr. F. W. Hartley, Mr. A. Rigg, M. J. Walker, and Mr. W. Schönheyder; as honorary secretary and treasurer, Mr. Alfred Williams; and as auditor, Mr. W. H. Bennett. It was announced by the President that the following premiums have been awarded by the council for papers read during the year—to Mr. Henry S. Copland, for his paper on Modern Roadway Construction, and to Mr. George G. André, for his paper on the Application of Electricity to the Ignition of Blasting Charges. Votes of thanks were unanimously accorded to the President and council for 1878; to the honorary secretary and treasurer, Mr. Alfred Williams; to the acting secretary, Mr. Perry F. Nursey; and to Mr. T. H. Martin and Mr. H. Conradi, for acting as Scrutineers of the balloting lists.

**THE PROPOSED NATIONAL MINERS' RELIEF SOCIETY.**—A meeting of the provisional committee which was appointed at the conference in Manchester on the 20th. ult. for the formation of a Miners' National Relief Society was held yesterday at the old Town Hall, the High Sheriff of Lancashire presiding, when it was decided that it was desirable to form a permanent national committee, having for its objects (1) the formation in every mining district of a Miners' Permanent Relief Fund on the voluntary assurance principle; (2) the consolidation and economising of national help for miners by forming a general fund, open to public subscriptions and bequests; (3) to enquire into, and if possible still, the large surplus funds lying in different parts of the country; (4) to promote the economical distribution of existing relief funds subscribed by the public; and (5) to administer any funds that may be specially placed in the hands of the national committee with the object of establishing orphanages. For the purpose of carrying out these objects it was decided that a representative meeting of the authorities of existing miners' permanent relief societies, and others interested in the formation of a national organisation, should be held in London early in next year, at which a national committee should be appointed; and Mr. M. W. Peace (secretary of the Mining Association of Great Britain) was instructed to draw up a suitable trust deed.—*Manchester Examiner.*

## Original Correspondence.

## THE DISCOVERY OF GOLD IN INDIA.

Reference was made in last week's *Mining Journal* to the highly successful explorations of Mr. R. Brough Smyth in the auriferous district of South Wynaad, where he had already discovered, in an area of 25 miles by 13, no less than 90 outcrops of ore reefs, with a thickness of 2 ft. to 4 ft., yielding from a few pennyweights to 200 ozs. per ton. From the samples of the auriferous quartz which have been received by Messrs. Smith, Fleming, and Co., it is evident that the reefs are very similar to some of those which have been most successfully wrought in Victoria, Australia; indeed, the resemblance to some of the Bendigo reefs is striking—abundance of visible gold, and the quartz stained with iron just in the same way. Other specimens show the gold in nicely decomposed matrix, and still others consist of rich auriferous gravels, so that, considering the large area over which the deposits are now proved to exist, there can be no question that there is a good field for British enterprise, more especially as labour is extremely cheap and abundant, and there are the utmost possible facilities for working. Some few months since the district was inspected for the Bombay branch of Messrs. Smith, Fleming, and Co., by Mr. Oliver Pegler, A.R.S.M., and although he appears to have made but a superficial survey at the time when he made the report, from which the subjoined are extracts, he has recorded enough to show beyond doubt that the district is capable of yielding enormous wealth. It appears that for the last two or three years Messrs. Smith, Fleming, and Co., have been actively engaged in connection with the matter—the delay having arisen principally from the fact of the district having hitherto been regarded almost exclusively as a coffee-producing district, which necessitated tedious negotiations for securing planters' rights. In this they have been fairly successful, so that there is at present every facility for extensive and profitable operations.

It should be distinctly understood that Mr. Pegler's present report is essentially crude and preliminary. His earlier work, he writes, was carried on under difficulties; many obstacles were placed in his way, and as far as the Alpha Mine was concerned he was kept from inspecting it, and it was only by resorting to a ruse that he visited the reef at all. Even then he was not shown the working where the gold existed in such astonishing richness, the excuse being that the place was under water. It was only upon his leaving that he heard the gold really did exist, and of course, on his later visit, he inspected the working. His report does not, therefore, strictly accord with what he would write with his present knowledge, his second visit having impressed him more favourably than the first. The report of this second visit will be published hereafter, but it may be at once stated that as the result of it he writes that he has no doubt exploration will give great results.

The range of mountains on which the Wynaad district is situated is of very ancient date, belonging to the palæozoic period, more especially to that of the silurian formations. The highest peaks of the range, as in the neighbourhood of Ootacamund, are formed of hard, dense, dark crystalline rocks of the metamorphic series of granites, syenites, and the more fissile varieties are also here present, and being softer they have yielded to the disintegration and denudation of time, and have formed the valleys and dells adjacent to the peaks. These softer rocks are of a much lighter colour than the harder granite and crystalline formations, and give a red and brown appearance to many portions of the surface of the country. The average altitude ranges from 7400 to 8400 ft. Before leaving this portion of the Neighberries for the more auriferous districts of Wynaad, I may observe that the whole of the formations are impregnated with black magnetic oxide of iron, which after a shower of rain appears as black sand on surfaces where the water has run over in streams. This is particularly noticeable along the roadsides. The crystalline rocks continue for a considerable distance down the slopes towards the Wynaad country, becoming lighter in colour, coarser in texture, and more laminated and fissile in structure, changing into the gneissic and more laminated varieties of metamorphic rocks. These orders are prevalent throughout the Wynaad district, although here and there the granite and syenite certainly do occur, but they now seem to have given place to the gneissic and laminated rocks.

I will enumerate the several peculiar formations which constitute the superficial crust of the country, and I may state that even now our knowledge is very imperfect relating to this question. Our experience is necessarily of a very superficial character. The extent of ground is very vast, and we are without profound mining operations to lead us to form an opinion of the deeper structure of the crust of the country. We have gneiss of light grey and pinkish shades often changing to granite, dense, hard, or coarse, easily disintegrated, and forming soft rock. Greenstone, chlorite, and diorite of hard fissile texture, with the planes of separation vertical. Talcose schists not thick, but in character very light, soapy, and talcose. Slaty decomposed argillaceous rocks, often stained deeply with ferruginous matter. It is difficult to say what this formation is, unless it is produced by ulterior decomposition and disintegration of the gneiss or granitic rocks.

Granite of the dark hornblende class.—I am also inclined to think fleshy varieties exist tending to gneiss, the surface being disintegrated and soft. Syenite undoubtedly is present. As previously mentioned, the granites and syenite do not show at the surface to any great extent, although it is possible that upon cutting through the more yielding and softer surface formations the harder crystalline rocks would be met with more generally. The whole surface of the ground is contorted, upheaved, and thrown about, forming abrupt ridges, valleys, peaks, rounded hills, and depressed surfaces; so that, combined with the altered metamorphic condition of the rocks, I consider it a most difficult problem to determine the true strike of the strata generally. Regarding the mineral question at issue, I may state that the whole of the country is ramified with a run of bold quartz veins, which are true reefs. The general run of these reefs is parallel, the direction of strike being almost invariably north and south, a few degrees west of north and east of south. The dip of the reefs is very low as seen at surface, and almost invariably to the east, varying when outcropping on the brows of the hills, especially when heavily developed, from almost horizontal to from 20° to 30°, and increasing in dip in lower grounds. These reefs, which are met with in every part of the country, are often of great breadth, up to 15, 20, and 30 ft. of thickness, and are composed of white crystalline compact quartz, identical in every respect with the reef quartz of Russia, Australia, California, Nevada, or any other known gold bearing country.

The quartz or veinstone, of course, is of varied character, changing from the compact sub-crystalline milk-white stone, to flesh colour, red, and brown, to a coarse nature highly ferruginous, charged with sesquioxide of iron, pyrites, pyrolusite, the vein soft, disintegrated, and laminated in structure, changing in some instances into a decomposed granitic nature, and thence footwall and lower country rock into talcose or micaceous schistose rock. The Bear reef is of this class. Almost invariably the large outcrops, which are very dense, compact, and hard, also the hanging or upper part of the lodes, are of this white quartz, but as the depth is increased the under or footwall changes into the ferruginous stone, or emerging into the schistose or decomposed rock beneath, deeply stained red with iron. Of course the several lodes vary much, some having the hard, dense, bold aspect, especially when striking across a hill summit, as in the Monarch reef; others show more the soft, porous, stained appearance, especially when outcropping under the brow of an escarpment; but I think that even in the boldest and most dense lode at a little depth the footwall will show this stained and less compact aspect. At a greater depth the stained appearance would again cease.

The Bear reef is an instance of the more ferruginous class of reefs. From the footwalls of these lodes leaders or small veins seem to strike to the west from the main reef, but I am inclined to think in many instances these supposed leaders are small flat parallel lodes which have been formed in the interstices of the laminated bed-rock, or in other instances portions of the main lode where, from the soft, slaty, laminated nature of the country rock in the earlier formation of the reef, it has broken up into numerous bands.

The enclosed granitic disintegrated materials, as in footwall of Bear reefs, are evidently portions of enclosed rock or bosses which have become disintegrated and changed. The Monarch reef is traced for nine miles. An outcrop of true chlorite or greenstone runs very near it.

The description of the two reefs may be taken as typical of all the various quartz veins or true lodes which occur here. It must, of course, be understood that all the possible variations between the two extremes above referred to will be met with. In the same reef in the course of its strike across the country will be found all the features of variation, from the hardest and densest outcrop to the soft decomposed vein in the different points of its run. In the Monarch reef this is forcibly apparent at some little distance from the hilltop overlooking Devalah. In the lower ground the lodes become soft and broken up.

Certain peculiarities in the physical aspect of these reefs may be briefly alluded to. Their dip is to the east, and at the higher peaks where outcrops appear the lie or dip is very low—only some 10°—and sometimes the reefs seem to form the back or slope of a hill-side. The dip is nearly always to the east. On entering lower ground they are found to increase in dip, and average from 15° to 30°—generally 20° to 30°. Almost invariably where the reef runs parallel to the run of the hill an abrupt and steep fall will be found to occur to the west of the strike, thus forming a bold escarpment, while on the eastern side the slope of the hill is very gradual. The reason of this is quite evident. The hard overlie and top of the reef forming a back and protection to the eastern slope enables it to resist the action of denudation; not so the western. The underlie here, the soft footwall, and the soft schistose casings beneath easily disintegrate and crumble away; thus landslips are formed, resulting in an escarpment, and the gradual wearing away of the reef from west to east.

From these slight descriptions of the quartz reefs of the country it will at once be clear that the dense, compact, heavy lodes have resisted denudation, and thus the high ridges and hill tops are formed. The softer, porous, foliated, and laminated portions of the run of the reef have been eroded away. It is a strange fact, which bears out the above, that many of the highest and boldest reefs which form the caps and ridges of the highest hills have no signs of having been touched by the native miners, who avoided, apparently, working on such dense, compact, adamant stone, and preferred the softer, more yielding veinstone on lower elevations.

From the above it does not follow that the solid compact development may not exist in the flatter land, or that the softer lode may not occur on a hill. Lodes are apt to change in depth in every possible way; a dense heavy lode may suddenly give way to the yielding one, and a soft, split up, or small and poorly developed reef may at a few fathoms depth suddenly or gradually change into a very thick, heavy, compact lode.

Mr. King, who wrote a report in 1877, estimates that 2000 ft. of superincumbent gneissic formations have been removed, but his several deductions thereto are scarcely tenable. In the metallic constituents common to the reefs pyrites is present in large amount, and iron and copper sulphides. It is probable also that sulphide of silver is associated with these mixed sulphides, of which the iron pyrites predominates. Pyrolusite and manganic oxides are present, and I am inclined to think that cobalt or nickel may possibly be found to exist. Magnetic oxide of iron abounds as black sand, and is present throughout the various country rocks. As necessarily follows, for a certain depth below the surface, within reach of the atmospheric influences, the pyrites has become decomposed to a great extent, changing into hydrated and sesquioxides of iron, giving a highly stained and ferruginous aspect to the lodes, more especially to the footwall. It seems to be in the lower part of the reef or lode that these heavy pyritic elements have settled. There can be no doubt that at a sufficient depth to resist atmospheric action the pyrites is unchanged, and the vein will assume a dense and hard character throughout. There can be no doubt that a great portion of the gold is closely combined and held imprisoned by the pyrites, which is undoubtedly auriferous in nature, and much resembles the auriferous pyrites of the Nevada mines. The ancient miners well knew this, and calcined all the stone before attempting to separate the much-wished-for gold, and to this day the intelligent Korumbars, who still mine and search for gold, calcine before crushing, washing, and amalgamating the residual fine gold.

There can be but little hesitation in determining the auriferous character of the contained pyrites, and in at once deciding that the Wynaad is a gold bearing land, and its reefs truly auriferous. The great question is whether this country is of sufficiently auriferous character as to give reasonable expectations of the successful issue of any mining operations which might be entered into on a large scale. The native Korumbars and Pannies still search and wash for gold, and find minute quantities, probably owing to the continued annual breaking up and disintegration of the innumerable fragments of veinstone which abound on certain flats and slopes. All this, however, is quite superficial. The alluvial deposits occur as recent and ancient.

**RECENT.**—First, surface earth, which spreads over the whole country. Second, present river beds and bars. Third, recent deep alluvial deposits. Operations are only carried on by native washers in the first and second at present, and we know but little of the latter deep deposits, which occur as large extending flats, and are now swamps often utilised for cultivating rice and paddy. At or near Devalah I discovered evidences of extensive old workings on one of these flats, numerous pits or shafts having been sunk, probably to the lower white clay or mother rock, and the lower stratum of recent earth, debris, or clay, would contain the gold.

**ANCIENT DEPOSITS.**—Of these also we have but few indications; however, since the writing of Mr. King's report satisfactory proofs have been arrived at of the presence of these in the Wynaad. Ancient alluvial beds and deposits are common to all true gold countries, and are the accumulations of old rivers or sheets of water, which flowed and extended, geologically speaking, many ages ago when the crust of the country was higher and less denuded than at the present time, when the streams have eaten deeper into the earth's crust, have become narrower, deeper, and more rapid in their flow. The contour of the country having completely altered, the present streams running in very different courses, and, as explained above, at a much deeper level than the ancient streams. As may be expected, the deposits may be discovered where no existing river is near for some miles, through great alteration of the surface of the country. Often these cement beds, as they are now frequently called, have become covered up by more recent surface washings, by the disintegration of the higher slopes at dates after their deposition, for it must be remembered that, whilst the main level of streams are lower than the ancient beds, a river running at a higher altitude may have had its course ultimately turned over the bed, which occurred at a lower elevation on the sloping country, and would thus cover up and hide the ancient bed.

Now, these cement beds are all more or less auriferous, and in America are washed bodily down by gushing shoots of water in great quantity. They run down long and wide gutters for some miles, the gold settling among the stones which pave the bottom of the channel, and is collected at various periods. In other places, where the cement is too hard or water scarce, the deposit is removed and crushed bodily. If too poor the lowest portion resting on the mother rock or older strata is simply mined. Sometimes shafts are sunk considerable depths to cut and work these beds. At Sceptette the present river of that name has cut through an ancient and true cement deposit, and a clear section is shown on the present river escarpment at a very few feet above the present stream. The ancient bed exists as a mixture of rolled pebbles, mostly quartz stone, fragments of country rock, &c., cemented with the sand and (evidences of a dark material) also white clayey and silicious seams into a hard dense conglomerate. There is a section of some 20 to 30 ft. of recent alluvial deposits, and above it some 10 or 15 ft. of recent alluvial deposit, thus disguising its presence. The bed rests on a hill of rock, which is very soft and decomposed, of a red colour, as if of a granitic or gneissic nature, but much decomposed, probably at the time of the ancient sheet of water or stream existing above. The present stream cuts it almost at right angles, or apparently so; and there can be no doubt that the old bed represents a true auriferous cement deposit, and was deposited by a very different system of



river courses and flow to those existing at the present day. It has been pierced to some 20 or 30 ft. by a drift, which was full of water when I visited it, but which did not prevent it being seen into. The drift had been left at its commencement, probably through the intense compactness and obduracy of the deposit.

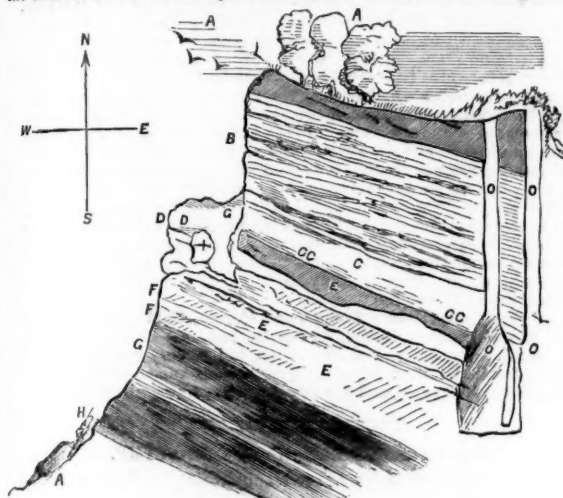
The natives had also made some attempts at working the bed, and had evidently removed some 4 tons of the material, but had given up attempting to mine the deposit, the small amount of gold present evidently not being sufficient to induce further work. They had worked into the soft rock beneath the deposit, and then broken down the suspended cement. There can be no doubt that this bed of cement is auriferous, but to a very limited extent. It is, however, quite possible that the lowest strata of the deposit might be worked to a profit, as there is sufficient water adjacent for almost any purpose.

Having now established the fact of the Wynad being a true gold district, I may proceed to bring before your notice the deductions that may be arrived at relative to the existence of a sufficient quantity of the precious metal to make gold mining there profitable.

The several headings under which we can discuss this important question are as follows:—

- 1.—The wide spread occurrence of gold in alluvial, river beds, and surface of ground.
- 2.—The great extent of ancient mines and mining operations, and evidences of systematic mining on a large scale, and also the operations carried on by native tribes at present.
- 3.—Two tribes of native gold seekers exist, one, being very intelligent, points to the probable fact that they are the descendants of skilled miners.
- 4.—Geological deductions: the fineness of the gold, strength of lodes, probability of deeper ground being productive; alluvial beds, deep, recent, and ancient; reason of the surface gold being fine, and no nuggets at surface up to the present time; continuation of lodes in depth.
- 5.—Great extent of geological development of the district. Similarity to the chief gold-bearing countries—Australia, Russia, California, and Nevada.

The pyritous veins of the Nevada mines being highly auriferous. Annexed are some rough sketches, intended to convey an idea of the character of the country, the reefs, and the ancient workings:—



A, shows a section of the strata of the Bear Reef at right angles to the strike of the reef near Devalah.

A, surface alluvial. B, gneissic strata.

C, reef, upper part white. C C, ferruginous footwall.

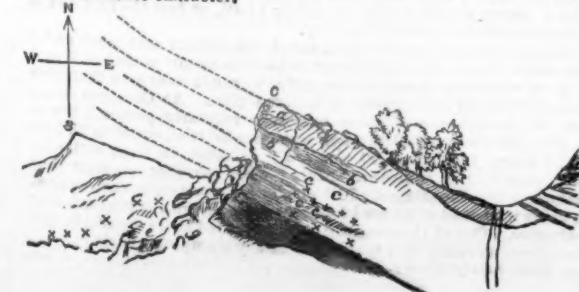
D, portion left as arch by ancient workers, very hard.

E, old native open-cast working, penetrating beneath footwall of lode into the ferruginous quartz; old archway still left.

F, old pits or shafts sunk some distance from surface; some to depth of 70 ft.

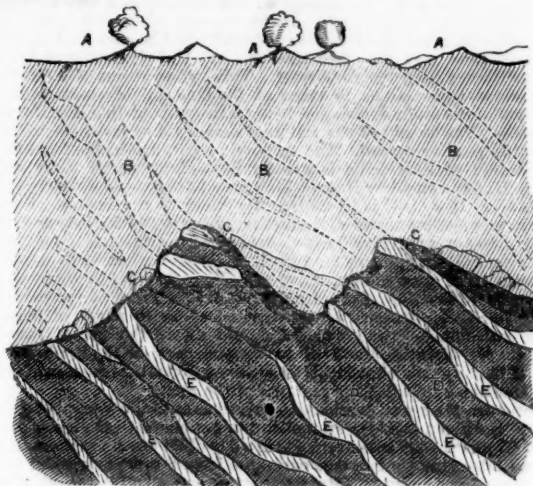
G, shows a bird's-eye view of the outcrop of the Monarch Reef on a hill top, and the vein will be seen striking down the hill slope. This reef is traced for nine miles.

H, bold outcrop of reef on hill top, hard white quartz. I, outcrop down the slope. J, loose boulder of veinstone. K, foot country rock of a talcose character.



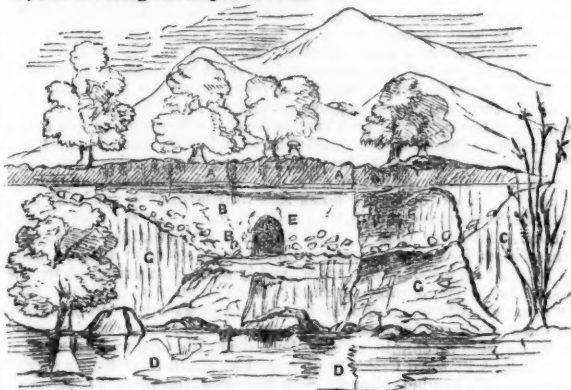
Section of a hill in the neighbourhood, showing outcrop of the reef, and the manner in which the reef is gradually wearing away from west to east.

- A, hard surface of reef, and which for some little distance forms the surface of the eastern slope of the hill.
- B, soft footwall.
- C C, leaders and soft ground, full of ferruginous bands of quartz, laminated with mother rock, decomposed soft laminated, and very varied, but all red or yellow in colour, with bands of white flookan here and there.
- D D, strata, thin, of underlying talcose schist.
- E, boulders of compact veinstone, fallen down.
- F, dotted lines show where reef had once continued, but through vast ages had washed away.
- G, G, vast old workings, and remnants of extensive sluicing and washing.



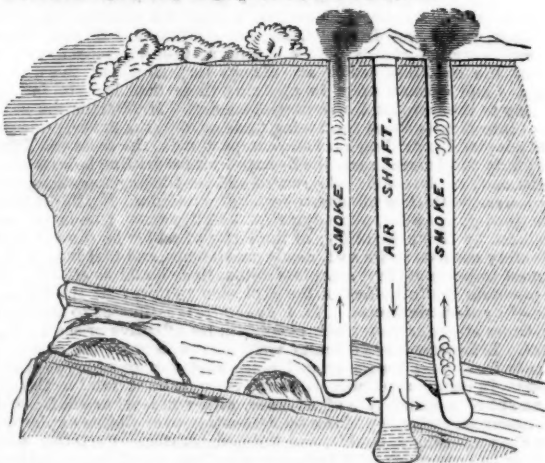
The object of the above sketch is to show the denudation (estimated by Mr. King, Government geologist, at 2000 ft.) and the probable lie and development of some of the reefs. It will be observed that the heavier and more developed portions of the veins appear to flatten as if borne down by the greater strength and weight existing in that portion of the reef. Notice the development on the hill tops and the ridges which have resisted denudation.

- A, ancient land surface of gneissic crystalline and schistose formations.
- B, continuation of veins (run) denuded away.
- C, present surface outline of country.
- D, country rock section.
- E, quartz and auriferous veins or reefs.
- G, soil covering the slopes of hills.

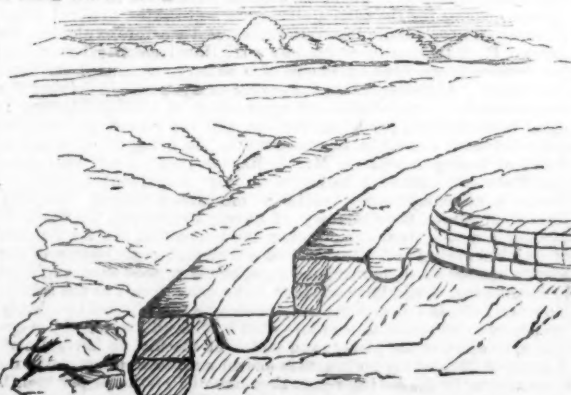


The above is a faithful representation of the alluvial cement bed at Seeputee, as it appears on the river side.

- A A, surface soil, from 5 to 10 ft.
- B, cement bed, or ancient river bed.
- C, decomposed vertical rock.
- D, present river Seeputee.
- E, old working.
- F, short drift, recent.
- G, excavation in soft rock under old cement bed.
- H, lowest layer, very large pebbles, much rounded.



The above is a section showing ancient mines, and method adopted of using fire to bring the roof down.



The above shows remains of old work in the shape of retraced sluicings, the face of each stage being built up with country stone, granite, or similar material.

# THE DIVISION OF THE ELECTRIC LIGHT.

THE REYNIER LAMP.\*



Fig. 1.



Fig. 2.

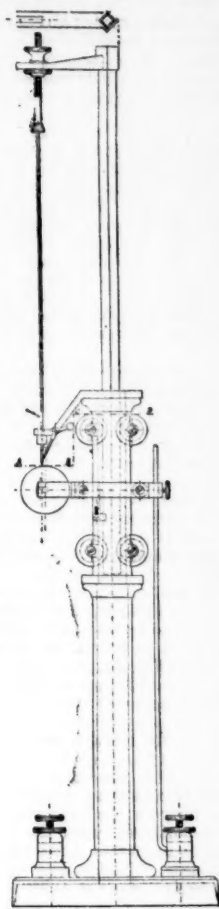


Fig. 3.

It is well known that the electric light can be obtained in two distinct ways—either with the voltaic arc or by the incandescence of a refractory body heated by the passage of a current. It is the second mode alone which will at present be considered. The experiment of reddening a platinum wire—or, better, a wire of iridio-platinum—by placing it in the circuit of an electric current, is one of the most frequently made in physics. The heating is the greater in proportion to the resistance of the wire, and for a given metal the resistance increases as the diameter is diminished. Light is obtained by this means, but it is very small in quantity. It must not be said that, by some artifice hitherto unknown, the production of useful illumination by the incandescence of a metal is impossible; but until now this method has not produced light properly so called—that is to say, light capable of being practically employed for illumination. One of the principal inconveniences of metallic wires is that if the intensity of the current be not very carefully attended to the wire melts.

Mr. King, an English physicist, is, says Mr. Fontaine, the first who entertained the idea of replacing the voltaic arc by the incandescence of a conductor, his patent being dated November 4, 1845, and what is curious in this patent makes mention of platinum and retort carbon—the two materials which have since been employed by all who have turned their attention to the same problem. My invention, says Mr. King, has for its object the employment of metallic conductors, or continuous carbons heated to whiteness by the passage of an electric current. The best metal for this purpose is platinum; the best carbon that from gas retorts. According to Mr. King's arrangement the light was produced in a vacuum tube. A little rod of carbon was used for the production of the light. The two ends of this rod were embedded in two small carbon blocks, kept at a proper distance from each other by the porcelain frame to which they were fastened. The lower carbon block was in connection with a metallic conductor, terminating in a bath of mercury. The other conductor was connected with the voltaic pile. The inventor then produced a vacuum in the tube, and placed at discretion one or several lamps in the circuit, taking care to regulate the current so as not to melt the carbon rod. It will thus be seen the divisibility of the electric light is no new idea. The real difficulties encountered by Mr. King and all the physicists who later revived his idea really arose from the cutting of the carbon pencils, which taken from a non-homogeneous mass were very costly and easily broken, and also in the absence of a good generator of electricity.

At present, however, thanks to the progress made with dynamo-electric machines, and especially to the admirable little artificial carbons manufactured by Mr. Carré, of Paris, inventors have a much better chance of producing a good apparatus, and of securing its application. It was in studying the question from this point of view that Mr. Reynier, already known for his regulator by circular rheophores, was led to design the lamp which bears his name. Mr. Reynier had made experiments under the direction of Mr. Fontaine with Russian lamps, similar in principle to that of Mr. King, and he had observed that the carbon pencil between the two blocks wore especially in the middle, and that when extinguished the debris represented a notable proportion of the small carbon in ignition, whence a considerable loss of the carbon rod. He had also concluded, from the fact of the combustion of the carbon, that the light was more intense in the open air than in the vacuum. These observations led Mr. Reynier to endeavour to discover the means of completely consuming the carbons and burning them in the open air. After many failures he arrived at results which were recorded in the note presented to the Academy of Sciences in May, by Count Du Moncel. The views of Mr. King appear to have been revived by Mr. Lodyguine, a Russian physicist, who obtained a prize at the St. Petersburg Academy of Sciences in 1874. The advantages offered by carbon were then very clearly pointed out by Mr. Wild, who was entrusted to report upon the prize to be awarded. Carbon, he said, possesses at an equal temperature a much greater radiating power than platinum; the calorific capacity of carbon is much less, so that the same quantity of heat raises the carbon to a higher temperature than it would raise a platinum wire. Moreover, the electric resistance of carbon is about 250 times that of platinum, so that the carbon pencil may be much larger whilst raising its temperature as much as metal; and, lastly, the carbon is infusible, and its temperature may be raised without danger of fusion.

Several Russian inventors—Messrs. Kosloff, Konn, Bouliquin, and others—have been working in the same direction, both in Russia and in Paris, and their efforts have not been useless, for they have sustained attention in this interesting question. At the same time, Mr. Ferdinand Carré has succeeded in producing artificial carbons of any diameter and of any length, which has been of paramount importance to those who have been attempting to produce the light by incandescence. In the memoir read by Count du Moncel before

\* Eclairage à l'Electricité; lampe système Reynier. Par Hippolyte Fontaine. Revue Industrielle. Fractionnement de la Lumière Electrique. Par Alfred Naudet. La Nature.



the Academy of Sciences it was stated that the new Raynier electric lamp by incandescence depends on the following principle. If a thin pencil of carbon pressed laterally by an elastic contact, and pushed forward in the direction of its axis upon a fixed contact, is traversed between these two contacts by a sufficiently energetic current it becomes incandescent in that part, and in burning thins down towards the extremity. As the consumption of the end goes on the pencil, constantly pushed forward, progresses by sliding between the elastic contact, so as to abut incessantly upon the fixed contact. The heat developed by the passage of the current in the carbon pencil is greatly increased by the combustion of the carbon. At first Mr. Reynier contented himself by pressing the carbon pencil, C (Fig. 1), upon a small mass, B, also of carbon, establishing a lateral contact, *l*, to limit the length of the incandescent portion, *ij*. Then he puts into communication the mass, B, with the negative pole, and the contact piece, *l*, with the positive pole of a pile. It will then be seen that the carbon pencil becomes pointed at *j*, and is consumed as regularly as an ordinary candle. But he showed at the same time that the impurities contained in the carbon left a residue which rapidly encrusted the contact; and, not wishing to complicate his lamp by the addition of a counterpoise, determined to replace the lower fixed contact by a movable one (Fig. 2).

In this new arrangement the rod, C, rests in front of the vertical axis on a little cylinder of carbon, B, which the tangential composition of the weight of the rod causes to rotate, and consequently removes the residue which isolates the point. Starting with this idea, Mr. Reynier has made a series of improvements in his apparatus, until at last he has hit upon the combination shown in Fig. 3, which is especially remarkable for its simplicity. The carbon pencil is fixed at the extremity of an arm attached to a square brass rod, which slides into the lamp standard between four little rollers. The cylinder of carbon is supported by a collar fastened to the top of the lamp standard. The cylinder is isolated by a mica fitting, and its axis rests on a balance. The carbon is guided a little above the upper contact by a silver dowel, and the upper contact is obtained by a little block of carbon affixed to the extremity of an oblique rod in direct contact with the body of the lamp. The wire from the positive pole of the battery is connected by the screw on the left side (Fig. 3), the wire from the negative being connected with the other. The pencil of carbon being supported on the cylinder or wheel makes it rotate very slowly, and this cylinder being mounted on a little balance the motion is diminished, and the breakage of the ignited carbon pencil is prevented. The carbon pencils are 1-12th of an inch in diameter, 1 ft. long, and last for two hours. This lamp has been worked with a battery of 12 Bunsen elements, and the light given is estimated to be equal to 15 or 20 Carcel burners, the light at the same time being very steady.

Some experiments with the Gramme machine and ten Reynier lamps, made at Messrs. Sautter and Lemonnier's, at Paris, gave excellent results. The Gramme machine, worked by a well-arranged portable engine, was run at 920 to 930 revolutions, and the resistance between the machine and the lamps was 100 metres of  $\frac{1}{2}$ -in. copper wire. The carbons were of the size mentioned (1-12th in. pencils,  $\frac{1}{4}$  in. diameter cylinders, 2-5ths in. thick in the centre and 1-6th in. at the circumference), and the results were that with five lamps on the circuit the galvanometer indication was 25; intensity of light, 15 burners = 75 burners total luminosity. With six lamps on circuit the galvanometer indication was 20; intensity of light, 13 burners = 78 burners total luminosity. With seven lamps the galvanometer indication was 20; intensity of light, 10 burners = 70 burners total luminosity. And with ten lamps on circuit the galvanometer indication was 15; intensity of light, 5 burners = 50 burners total luminosity. In conclusion, M. Fontaine states that the Serrin lamp under the same circumstances, with a deviation of 21 per cent., gave a luminous intensity of 320 burners. The Raynier lamp he says is simple, easily used, and not costly—three great recommendations—and what may be reserved for him in the future in the way of industrial illumination has yet to be seen.

### ROCK-BORERS.

A full muster of the members and friends of the Mining Institute of Cornwall was witnessed at the Town Hall, Camborne, on Tuesday, to listen to a paper by Mr. John Darlington on the above subject. Not only is Mr. Darlington an engineer of wide experience and close observation, but he is the inventor of a rock-drill, and is known to possess full and accurate knowledge of all that pertains to that valuable aid to manual labour. His paper was, therefore, looked forward to with the greatest interest. Nor was the audience one whit disappointed. From a document, which will make an octavo pamphlet of 150 pages, Mr. Darlington read extracts, and out of these we will endeavour to make an abbreviated account. Among those present were—Mr. G. L. Basset, the President of the Institute, in the chair; Messrs. J. H. Bolden, D. W. Bain, W. Husband, and J. R. Daniell, Major and Mrs. Pike, Mr. and Mrs. A. Preston and Miss Preston; Mr. E. Scudamore Angove and Mrs. Angove; Mr. C. Twite, Capt. W. Teague, W. Teague, jun., R. Pryor, W. Pryor, Rich. A. James, and T. Angove; the Revs. W. C. Chappel, Crutell, and James Parkes; Dr. Hudson, Mr. Butlin, Mr. N. J. West, Messrs. J. Budge, J. Henderson, W. H. Rule, F. Scott, Goffin, Davey, Tyack, Thomas, Hocking, Jennings, Kitto, B. Smith, G. Rustice, E. Carter, C. Thomas, W. Rich, J. Borlase, &c. Mr. Provis, the Secretary of the Institute, having read the minutes of the last meeting, Mr. Basset at once called on Mr. Darlington to read his paper, entitled—

### OBSERVATIONS ON ROCK-BORING MACHINERY.

Mr. DARLINGTON observed that only a few years had elapsed since rock-boring machines were rendered successful in subterranean operations; yet at this time their application extends to numerous mining centres throughout the globe, and in years to come this class of machinery, mitigating the miner's toil and aiding the object of his research, will occupy yet a more distinctive and important position. The boring machine has been aided by new explosives of unsurpassing strength. The result has been a rate of progress in sinking and driving levels of the most beneficial character. To attain a quick rate of speed it is indispensably necessary to have recourse to good boring machinery, strong explosives, quick charging of the shot holes, and rapid removal of the stuff. Compressed air is the only pressure fluid suitable for driving boring machines in close levels and shafts. There are varied and serious losses, so that the useful work stored within the air receiver in the form of compressed air only represents from 35 to 40 per cent. of the work due to steam, while the work returned by boring machines is only 20 to 25 units for every 100 of the steam work. In other words, from four to five boiler-horse-power is required to give one effective horse-power in the boring machines. Air compressors may be driven by means of water-wheels, turbines, or water-pressure engines. Turbines, running under a fall of 530 ft. of water make 300 to 400 revolutions per minute, while the compressors make 80 to 100 strokes. Wet compressors (at the Mont Cenis Tunnel) and fast-speed compressors (at the St. Gothard Tunnel) were first employed; the first-named is scarcely, if at all, employed in England; the latter have been mainly adopted, perhaps on account of their comparative cheapness of first cost. The wet slow compressor bears a somewhat similar relation to the fast-speed compressor that the Cornish engine bears to the locomotive—strength, durability, comparative slowness of speed, and economy. It gives the largest percentage of useful effect for the unit of power expended to secure it. The wet compresses the air by means of a column of water moved by a piston; the dry by the piston itself, acting directly on the air, two or three divided jets of water being sometimes introduced into the cylinder cover, and a water-jacket enclosing the cylinder, for the purpose of absorbing the heat of compression. The speed of a wet compressor is, however, limited to about 100 ft. per minute. The receiver and air-pipes should be of sufficient capacity to run the boring machines without exhibiting much variation of pressure. No exact rule can be laid down for determining the dimensions of the receiver, but if its capacity be eight or ten times more than the volume of air re-

quired per minute for the use of the machines it will, probably, be sufficient. Large receiver and air-pipes are desirable. The boring machines when well supplied with air will not only deliver their blows more uniformly and with the desired effect, but the friction in passing air through large pipes from the receiver to the machine will become inconsiderable.

The air-pipes from the receiver to the boring machine may be of cast or wrought iron, but in either case they should be provided with round or oval flanges, properly faced, recessed, or scored. The pipe-joints are readily and effectively made by means of flat rings of vulcanized rubber. In the levels the main may be laid on the bottom or hung on the side towards the roof, the latter being a position sometimes preferred in continental mines. The advance pipe is, in some instances, formed of one pipe sliding within another, the inner one being drawn out as the end of the level is advanced. In mine headings a single railway is generally laid for the use of the borer carriage and tram-wagons. In some cases where the end is of exceptional width and a maximum rate of driving speed is requisite—in other words where the stuff must be removed in the shortest time possible—two railways are laid altogether or for a short distance from the forebreast. This arrangement of a double way allows two wagons to stand at the face and of a continuous removal of the stuff, one wagon being always available for filling purposes. The weight of the rail used should not be less than 18 lbs. or 20 lbs. per lineal yard. The economic result attainable from the application of rock-drills is greatly dependent on the form and strength of the stand or frame which may be employed to carry the machines. If a drill is to deliver its blows to the bottom of its hole in an effective manner, it must not vibrate and be deflected, as it were, to any appreciable extent from its axial line, nor should the tool react without giving the full effect of its impact to the stone. A frame, to be satisfactory, must be sufficiently rigid to withstand the reactive twisting effect, consequent on the rapid reciprocation of the machines; it must be constructed so as to admit of being fixed and removed quickly. It should afford the widest range possible for directing the drill to various parts of the forebreast, or for angling the shot-holes to such an extent as to ensure, by means of the explosive, the removal of the rock.

Moreover, the frame should be contrived so as to allow ample space for the workmen to move around and to get access to the machines. At St. Gothard four cuts are made in a day of 24 hours; introducing and withdrawing the carriage consumes from 8 to 9 per cent. of the entire working period. [Mr. Darlington had a full description of the way in which the Darlington drill is worked, but omitted it as he did some scores of pages of statistics and other sterling information.] Mr. Darlington described in outline a shaft sinking stand introduced by himself at the Minera Mines, North Wales, in 1876. To Richard Trevithick belongs the merit of designing and employing the first machine for drilling rocks. Of this man, whom the world has not yet delighted to honour, it may be truly said he invented for the benefit of mankind—he laboured that others might enter into his labours. At the close of the year 1812 Trevithick had his attention called to a contract which had been taken by Messrs. Fox and Williams for quarrying stone, then required for the construction of the Plymouth Breakwater. On January 20 Trevithick, addressed a letter from Camborne to Mr. Fox, jun., that he had been boring lumps of Plymouth limestone at Hayle Foundry, and found that he could bore five times as fast with a borer turned round than doing the work by hand in the usual way, also that the edge of the boring-bit was scarcely worn or injured by grinding against the stone, as might have been expected. Again, on February 14 he wrote from Camborne that the men could bore  $\frac{1}{4}$  in. diameter 1 in. deep in every minute, with a weight of 500 lbs. on the bit. From the time the two men were employed boring a hole 12 in. deep he was convinced to a certainty that the engine at Hayle would bore as many holes in one day as will be sufficient to split 100 tons of limestone. For more than 40 years Trevithick's invention remained dormant. In 1844 Brunton, well known for his roasting-furnace, suggested a wind hammer for boring holes and ventilating the working face. In 1854 Bartlett constructed a boring machine for the Mont Cenis Tunnel, and since that time to the present inventors in Europe, America, and Australia have applied themselves with untiring zeal, in spite of opposition, prejudice, and ignorance, manifested by the many, to the production of machines until success in this as well as in other different paths of human progress has been achieved. In the race many fell out by the way. Among those may be cited Low, an able mechanic, an excellent draughtsman, and fertile inventor, and Edward Crease, who gave the world the "flying valve" and "double-headed piston," now the essential parts of three or four of the principal boring machines before the public. On the different varieties of percussion boring machines, it was observed that they all radiate, as it were, from two or three typical machines, and that several, if well and strongly made, will do excellent work, provided they are handled in a proper and an effective manner. No fair test of the efficacy of a drill is obtainable until it has undergone hard and regular work, along with other drills, on the same rock and under the same circumstances. High speed or low-speed is now due not so much to the machines as to having recourse to good tackle, able workmen, and a perfect organisation of the work itself. The most perfectly made high-speed locomotive cannot run quickly on a bad road, nor even on a good one can high speed be attained, unless the driver, signal, and station men do their duty promptly and effectively. So it is with rock-boring machinery; it is not the machines which are always imperfect, but the means adapted and insisted upon in applying them that lead to failure or only to the command of a partial success. Mr. Darlington next went into details about the boring tools or bits (the flat is, perhaps, best adapted for drilling hard and compact rock, the cross and X-bit for jointy and fissured rock, the Z-shaped bit for drilling holes in soft rocks, such as slate and shale), water and ventilating apparatus, and explosives, with a few minutes to heat and percussion. Mr. Darlington described gunpowder, nitroglycerine, and dynamite (the latter introduced by Noble, in 1867); of the latter of which he showed that its safety consists in its soft, mealy consistence, and that it is of the highest importance that complete detonation should be effected, so as to obtain the full effect of the explosion and prevent the formation of hypo-nitric fumes. No. 1 dynamite is estimated to be about six times stronger than black powder in its effective or shattering force. Lithofracture and tonite were also explained; the best fulminate fuses were recommended, since mistaken economy or carelessness in using unreliable fuses are errors almost fatal to the attainment of a quick rate of advance, either in level or shaft; and the enormous increase of force by detonation over simple explosion was shown. Single, double, and treble detonators—the latter containing 540 grammes of fulminate—were explained, and practical instructions given for successful firing by means of electric fuses. The important advantage of these fuses was shown—simultaneous explosion, complete removal of ground within the zone of the explosion, safety for the miner, efficacy in wet shafts, removal of appliances and tools more leisurely and carefully before exploding the holes. High tension fuses, fired by a frictional electrical machine; low tension fuses, fired by means of a battery, were explained and illustrated. At Ballacorkish the saving of dynamite in driving the deep level by electric fuses and application of electric blasting is equal to five pounds per lineal fathom, and the rate of progress accelerated from one-sixth to one-seventh. In going on to speak in detail of boring machines, Mr. Darlington pointed out that these constitute but one of a series of highly important inventions. Efficient air-compressors, suitable machine carriages, properly jointed air-pipes, the discovery of strong explosives, the development of a new system of arranging the shot-holes, the application of quick charging and blasting, and a thorough organisation of the work; but for these, boring machines, however good they might be in themselves, would have afforded but a poor result to the miner. Hole for hole, in one and the same rock, one machine will probably be nearly as effective as another—that is, if the diameter of the cylinder, velocity of the piston, and width of the tool be fairly equal. A speed of 20 fathoms per month in a level with four boring machines is no greater in the boring result than one of 10 fathoms per month accomplished by means of two machines. The work per borer may be regarded as equal, although the speed of the advance in the former

case is doubled. Mr. Darlington proceeded to minutely detail the organisation and conduct of the work, explaining the circular and the square cut, with a combination of the two—successful sinking by the circular cut system having been effected at Minera Mines—the exact position of each distinct hole being left to the judgment of the men directing the machines. Having given specimens of driving ends at Carn Brea, Maesteg, the Hoosac Tunnel, Ballacorkish, and described the methods adopted by Dubois and Francois, and W. Blanch Brain, Mr. Darlington said the general tendency of recent practice is to bring into use larger machines for boring, to increase the diameter of a part, if not the whole, of the shot holes, to lessen the number of holes in a given area of rock, and to employ a greater proportion of dynamite per hole. Charging and blasting, firing by electricity, the respective cost of dynamite and powder, removal of stuff, and the strength and fixing of boring machines having been dwelt on practical results were shown, and the economy and speed of boring machines established. Accompanied by formidable statistics the work and cost of the Darlington, Beaumont, Barrow, and Ingersoll drills were shown—for one valuable table Mr. Darlington expressed his obligations to Mr. Provis. The comparative advantages of power over hand drills was shown in the cost, progress, ventilation, fresh air for the miner to work with, the quickened chances of successful results, lessened capital expenditure, and abbreviation of dead charges from nine or ten to three or four years. Two machines and nine men in a level would be generally sufficient. Too much of the economic result is at present attributed to the boring, and not enough to the proper and effective organisation of the work. The boring machine must necessarily be a reliable and good one, constructed so as to withstand the heavy wear and tear to which it may be subjected. The apparatus on which the machines are mounted should be of ample strength for holding them firmly to their work, while giving them every facility for drilling shot-holes in any required position. Very high speed compressors are not desirable, but such as can stand reasonable wear, and yield a maximum result for the power expended to produce it. Employ the strongest explosives for the centre cut, and dynamite (not burn) the explosive. Fewer holes, drilled with machines of increased power, should be valued with the greatest cost of the explosive. Shot-holes should be bored as deep as may be found effective for the removal of the ground, having also regard to the time of boring, which usually increases with the increased depth of the hole. Electric blasting offers in itself an element of security and success. The time is near at hand when boring machines will form a part of every mining plant—that is, in cases where a considerable amount of work is intended to be done in moderately hard ground. It would be well to consider whether such plant should not be under the control of a mechanical engineer, rendered responsible for the efficient performance of the apparatus, and the judicious conduct of the work. The straightened and untoward circumstances connected with Cornish mining are not conducive to the trial of numerous experiments, even to add value to so important a subject; but the success of rock-boring machinery is established beyond any doubt or question, and it remained for the agent, and especially the young miner, to acquaint themselves with the various appliances in use, with the different methods and modes of organisation employed in performing the work, and then to apply their knowledge for the benefit of themselves and their fellow-men.

The President, Captain Teague, and Messrs. Goffin, Waddington, Husband, Darlington, Butlin, W. Teague, jun., and D. W. Bain spoke, the result being a too brief discussion, but a very cordial vote of thanks to Mr. Darlington for the great labour and research he had thrown into his paper, and the interesting extracts given from it.

### PATTERSON'S ELEPHANT ORE STAMP.

Patterson's patent Elephant ore stamp, which has been erected at Wheal Uny through the kindness of Captain Rich, the manager, for the purpose of testing its capabilities, was subject to a public trial on Tuesday under the supervision of Messrs. Willoughby Brothers, of the Central Foundry, Plymouth, the makers of the machine. Among those present to witness the working of the machine were Dr. C. Le Neve Foster, Captain Teague, Captain Teague, jun., Captain Pearce (Dolcoath), Captain James (Wheal Comford), Captain A. T. James (South Frances), Captain Thomas (late of Wheal Crever), Mr. W. Pike (Camborne), Mr. John Hocking (engineer, Redruth), and Mr. Scott (London). There was only one machine exhibited, with two heads making 130 strokes a minute, driven by a small engine, 8-in. diameter cylinder, with 12-inch stroke, giving out about 10 or 11 horse power. The ore-stamp was passed through a very fine grate at the rate of 1 ton in 75 minutes. One proof of the smallness of the power required to drive this stamp is the fact that it is driven with a 4-inch single belt, and the machine runs so easily that one-half of this on the tight pulley is sufficient to drive it at full speed.

The machine is a very compact one, the whole of the workings occupying but a comparatively small space, and everyone who has witnessed it are surprised at the great simplicity of construction, and the evident ease with which it does its work. Another feature, not less striking, is the fewness of its parts, and one very important consideration is that any ordinary mine smith can repair such parts as may get out of order. The result of yesterday's working was considered highly satisfactory as regards the quantity of stuff stamped in a given time, but from the fact of the steam being used in a non-condensing engine an accurate opinion could not be formed if steam had been used under the most favourable circumstances.

At a meeting of the managers and others interested in the surrounding mines, who expressed themselves as highly pleased with the simplicity and efficiency of the machine, it was proposed by Captain Teague, sen., and resolved, that with a view to thoroughly testing the elephant stamps a subscription should be raised from the different mines in order to pay part of the cost of hiring a condensing engine for working them. The Elephant stamp should be tested for a month; the coal and tinstuff carefully weighed, and a correct record kept of all expenses, and all items to be checked by a person on behalf of the mines, and some one on the part of the Messrs. Willoughby. In this manner the value of the stamps could be ascertained exactly. It was further resolved that Mr. Patterson and the Messrs. Willoughby be requested to look out for a suitable engine, and report to an adjourned meeting.

The Messrs. Willoughby Brothers, in estimating the cost of stamping about 1800 tons of ore per month, state that three machines would be required, each machine passing 20 tons in 24 hours. A 16-inch diameter cylinder engine, 32-in. stroke, making 70 revolutions per minute, having an average pressure on the piston of 18 lbs. per square inch, would give out 40 indicated horse-power, and would be ample to work the three machines, as shown by the fact that an 8-in. engine, 12-in. stroke, giving out 10 to 11-horse power, was equal to driving one machine. The 16-in. engine, being fitted with condenser and also cut-off gear, so as to work the steam expansively, and obtaining its supply from a properly proportioned boiler, would use up 100 or 120 lbs. of coal per hour, or about 24 cwt. per day of 24 hours. They estimate the cost for the month of coal, wages (two men and a lad), oil, grates, and heads, at 674.4s. per month, or nearly 9d. per ton. If the usual cost was 1s. 9d. per ton, then, where 1800 tons per month were stamped, the annual saving by using the Elephant stamp would amount to nearly 1100l., or just the first cost of three machines, including royalty.

This estimate of nearly 1100l. saved per annum was much under the mark, where the ore was not so hard to stamp as that of Wheal Uny, or where the grates in the coffer were not so fine, so that more tons of stamped ores passed in a given time. At Carigann Mines, near St. Austell, one of these machines regularly passed 1 ton in 51 minutes when tested through a six weeks' trial, equal to 23 tons in 24 hours, instead of 20 tons only as taken in their estimate. Then, again, the indicator showed when another machine was stamping free crushing stuff, that 5-horse power only was required to drive it instead of above 13-horse power allowed in the foregoing estimate. One of these machines had worked some months in San Francisco, showing its capabilities at dry stamping quartz.

—Western Daily Mercury.

Ten years published for Circular was the following in reply to o Mine.

In the year attention was given to "Compendium by Mr. Watson" "Records of Mines" (second Mining Interest in 1843, Mr. Watson's book was the first in the series, and from the embossed to with mines and Messrs. W.A. mines, as well their advice at founded on the but they will always equal to a mining.

The great ex by country was the state of Corn mining compar their Circular m to state. That they i pled to most Mining Shares. They also b document in a market prices the same terms riles dealt in u Having agree inspected for the wear mine fol

We agree closures at r a company's st to enlighten Mountain machinery is nearly 4000l. limited, and erected and which if be invested hand, and is good and las limited. The 5000l., of wh Du is in 12, share paid up Parys Mount about 1000l. already made liability is p raised so lon great machie the small po desire of sha dividends fo should be set Had Tanker present posit

South Ron pany have a winding-up authorising pounds in ha successful, an has not all b estimate, is v fore, if the d take up the capital that carbonate of In referen little unform certain, if m be practised CARBONATE article, nor 1 SATURDAY, 1 Great Baxey, 1 64 to 7; South 11 to 13; Cleme 26s.; Leadhill Tankerville, 23 24; Peavor, 6 MONDAY, 12 In standards 28 to 30; South 8 to 9; West F 64 to 66; West 2 to 24; Peavor 7s. 6d., to 9s. 6d. Richmond, 10s. TUESDAY, 13 30 to 32; Dolc South Frances, 24; Peavor, 6 Roman Gravel, 10s. to 12s. 6d. GLENNY, 10s. to 12s. 6d. FRIDAY, 13 about the RING FRIDAY, 13 28 to 30; South 4 to 44; Peavor 24 to 26; Parys West Tolgus, 3

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# **WATSON BROTHERS' MINING CIRCULAR.** **WATSON BROTHERS,** **MINEOWNERS, STOCK AND SHARE DEALERS, &c.** **1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON.**

Ten years ago the weekly information which had previously been published for a great number of years in *WATSON BROTHERS' Mining Circular* was transferred to the columns of the *Mining Journal*, with the following announcement; which is now reproduced in consequence of the numerous letters and enquiries handed to them of late in reply to one which appeared in the *Journal* on the Clementina Mine.

In the year 1845, when mining was almost unknown to the general public, the first of its advantages, when properly conducted, in the attention was first given to the public, and published in 1845, "Compendium of F.G.S., author of 'Gleanings among Mines and Miners,' by Mr. WATSON, F.G.S., author of 'Gleanings among Mines and Miners,' (second series, 1863), 'The Progress of Mining,' with Statistics of the Mines of the United Kingdom, &c., &c. In the Compendium, published in 1845, Mr. WATSON was the first to recommend the system of a 'division of small risks in several mines, ensuring the success in the aggregate,' and Messrs. WATSON BROTHERS have always a selected list on hand. Perhaps at no former period in the annals of mining has there been more peculiar need of honest and experienced advice as to the value of shares and the position of the mines, and from the lengthened experience of Messrs. WATSON BROTHERS they are emboldened to offer, thus publicly, their best services and advice to all connected with mining.

Messrs. WATSON BROTHERS are daily asked their opinion of particular mines, as well as to recommend mines to invest or speculate in, and they give their advice and recommend mines to the best of their judgment and ability, founded on the best practical advice they can obtain from the mining districts, but they will not be held responsible, nor subject to blame, if results do not always equal the expectations they may have held out in a property so fluctuating as mining.

The great extension of mining business, the difficulty so often complained of by country shareholders in getting accurate and disinterested information as to the state of Cornish and Foreign Mines, and of the financial and real position of mining companies generally, have induced Messrs. WATSON BROTHERS to make their Circular now published in the *Mining Journal* more extensively known, and to state—

That they issue daily to clients and others who apply for it a Price List (as supplied to most of the London and country papers), giving the closing prices of Mining Shares up to Four o'clock.

They also buy and sell shares for immediate cash or for the usual fortnightly settlement in all Mines dealt in by the Mining and Stock Exchanges, at the close market prices of the day, free of all charges for commission. They deal also, on the same terms, in the Public Funds, Railways, Telegraphs, and all other Securities dealt in upon the Stock Exchange.

Having agents in all the mining districts, they are constantly getting mines inspected for their own guidance, and will also obtain special reports of any particular mine for their clients, for the inspecting agent's fee of £2 2s.

We agree with our correspondent that, judging from the disclosures at recent meetings, it is well to know how the finances of a company stand before buying shares; but we are not in a position to enlighten him as to one or two of those he names. D'Esreshy Mountain is in 1024 shares, of 20s. each, limited, and fully paid. The machinery is all erected, has gone to work, and the company have nearly 4000l. capital besides. Aberllyn is in 2560 shares, of 10s. each, limited, and fully paid, and when all the necessary machinery is erected and paid for the company will have at least 4000l. in hand; and which if, as expected, the mine at once makes good returns will be invested as a reserve fund. D'Esreshy Consols has over 3000l. in hand, and is nearing Cobblers' lode, which we trust will prove a good and lasting one. Parys Mountain shares are 3s. fully paid, and limited. The price to be paid to the company for Morfa Du was 5000l., of which we think about 1500l. remains to be received. Morfa Du is in 12,000 shares, of 1s. each, limited, and with 17s. 6d. per share paid up, but only a little over 7000 were issued; after paying Parys Mountain, therefore, the finances will be in a good position; about 1000l. has been spent in the bluestone, and a return of 500l. already made. In cost-book mines, as we have often explained, the liability is practically unlimited, and any amount of capital can be raised so long as the shareholders are willing to pay calls. The great mischief attending many of our limited companies has been the small portion of capital left for working purposes, and the desire of shareholders to divide profits closely up, so as to get large dividends for a time. A small sum concurrent with dividends should be set aside and invested as a reserve fund for contingencies. Had Tankerville done this the mine financially would not be in its present position.

South Roman Gravel shares are 1l. 10s. fully paid, and the company have about 2000 unissued. At the last meeting, instead of winding-up the company, the shareholders passed a resolution authorising the directors to expend the balance of a few hundred pounds in hand as an experiment, which so far has been eminently successful, and may lead shortly to important results. The money has not all been expended yet, and the machinery, even at a low estimate, is worth, we should think, 700l. The question is, therefore, if the discovery continues, will the shareholders when required take up the unissued shares at a price, so as to give any further capital that may be necessary? The lode at present is yielding rich carbonate of barytes and stones of lead.

In reference to the question of labour it would be well if some little uniformity of wages could be adopted; and one thing is quite certain, if mines are to be worked profitably every economy must be practised with metals at their present price.

**CARBONATE OF BARYTES.**—We cannot say the price of this article, nor name a market for it. Perhaps some of our correspondents may know.

**SATURDAY, DEC. 7.**—Market very quiet, and prices nominal. Van, 18 to 19; Great Laxey, 18 to 19; Carn Brea, 34 to 35; Dolcoath, 29 to 31; South Frances, 6 1/2 to 7; South Condor, 10 1/2 to 11; Roman Gravel, 6 1/2 to 6 3/4; Aberllyn, 11 to 12; Clementina, 1 to 1 1/4; Parys Mountain, 8s. to 10s.; Morfa Du, 17s. 6d. to 18s.; Leadhills, 2 1/2 to 2 3/4; East Van, 2 to 2 1/4; Devon Great Consols, 30s. to 35s.; Tankerville, 2 1/2 to 3 1/4; West Van, 4 to 4 1/4; Aggar, 4 to 4 1/4; Grenville, 2 to 2 1/4; Peavor, 6 1/2 to 7; Santa Barbara, 37s. 6d. to 42s. 6d.

**MONDAY, DEC. 9.**—Tin shares are weaker in consequence of a fall of 3s. per ton in the standard. Shares in lead mines steady. Carn Brea, 32 to 34; Dolcoath, 28 to 30; South Condor, 10 1/2 to 10 3/4; South Frances, 6 1/2 to 7; Tincroft, 8 to 9; West Frances, 3 1/4 to 4; Aggar, 3 1/4 to 4; Grenville, 2 to 2 1/4; Peavor, 6 1/2 to 6 3/4; Tankerville, 2 1/2 to 3 1/4; West Chiverton, 2 to 2 1/4; Leadhills, 2 to 2 1/4; Pateley Bridge, 2 1/2 to 3; West Tolgus, 38 to 40; Parys Mountain, 2s. 6d. to 3s. 6d.; Marke Valley, 16s. to 18s.; Devon Great Consols, 30s. to 35s.; Richmond, 10s. to 11s.; Santa Barbara, 37s. 6d. to 42s. 6d.

**TUESDAY, DEC. 10.**—Market very quiet, and prices about the same as yesterday. **WEDNESDAY, DEC. 11.**—Market very quiet. Tin shares weaker. Carn Brea, 32 to 34; Dolcoath, 27 to 29; Tincroft, 7 to 8; South Condor, 10 1/2 to 10 3/4; South Frances, 6 1/2 to 7; West Frances, 3 1/4 to 4; Aggar, 3 1/4 to 4; Grenville, 2 to 2 1/4; Peavor, 6 1/2 to 6 3/4; Aberllyn, 11 to 13; Van, 18 to 19; Great Laxey, 18 to 19; Roman Gravel, 6 1/2 to 6 3/4; Tankerville, 2 1/2 to 3 1/4; Parys Mountain, 8s. to 10s.; Glenroy, 10s. to 15s.; Devon Great Consols, 30s. to 35s.; Santa Barbara, 37s. 6d. to 42s. 6d.

**THURSDAY, DEC. 12.**—There is very little business doing, and quotations are about the same as yesterday.

**FRIDAY, DEC. 13.**—Market continues very quiet. Carn Brea, 31 to 33; Dolcoath, 28 to 30; South Frances, 6 1/2 to 7; South Condor, 10 1/2 to 10 3/4; Aggar, 4 to 4 1/4; Peavor, 6 to 6 1/2; Van, 18 to 19; Great Laxey, 18 to 19; Tankerville, 2 1/2 to 3; Parys Mountain, 8s. to 10s.; East Van, 2 to 2 1/4; Aberllyn, 11 to 13; West Tolgus, 38 to 40; Devon Great Consols, 30s. to 35s.

**MR. WILLIAM H. H. WATSON** having had some years' experience in Practical Engineering and Mining in Cornwall, as well as two years' practice in the London Stock and Share Markets, begs to offer his advice and services to Shareholders and Intending Investors in Mines, and in the Purchase and Sale of Shares.  
 Address: W. H. H. WATSON, 1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON, E.C.

**HERODSFOOT.**—It was decided on Tuesday by the shareholders to offer the mine and its valuable plant for sale by auction as a going concern. The Chairman (Mr. M. Loam) stated that 10 tons of lead had been raised from the mine during the past week. It appears there is a 60-in. pumping-engine, two boilers, and all the necessary machinery belonging to a productive mine. The plant is of considerable value. The course they are about to pursue is occasioned by financial difficulties preventing the further development of the mine by an additional outlay on the part of the present shareholders.

**WEST POLDBICE.**—It is stated that the late Sir F. M. Williams's large interest in West Poldbice—about 1100 shares out of 1733 into which the mine is divided—has been sold by Lady Williams to Mr. J. R. Paul, solicitor, of Truro, and other gentlemen for about 7000l. These shares about three years ago touched 30s. each, and equal to about 33,000l. on the above interest.

**DOLCOATH.**—We are glad to hear that this famous old mine is looking exceedingly well. Dolcoath will lose a good friend in Sir Frederick Williams, who always took the warmest interest in its prosperity. When Sir

William Williams died a few years ago he was the largest advertiser in the mine, holding at that time 175 shares, which were then marketable at 135l. per share, worth (say) 23,000l.—*West Briton.*

## **THE HEATING POWER OF HYDROGEN.**

TO THE EDITOR OF THE MINING JOURNAL.

SIR,—As the result of enquiries I have made, and experiments I have witnessed, in the process of making gas from superheated steam and petroleum, in which the superheated steam is made to give up its oxygen during its passage through red-hot iron tubes and then through coke and iron scraps, thus producing hydrogen gas, subsequently combined with petroleum to give it illuminating power, I have ascertained that the cost of the hydrogen is not more than about 4d. per 1000 ft. It occurs to me that this fact can be utilised in the reduction of metals by employing the hydrogen thus produced as a heating power in furnaces constructed to admit of such use. If consumed as fast as it is made the danger from storing it would be avoided. Forty years ago I had a narrow escape for my life while experimenting with this gas, and retain a respectful admiration of its power. One ton of coal will now raise as much steam as 60 years ago it took 10 tons to produce, the gain being due to the more scientific employment of the fuel; but the waste of heat is still so great that its utilisation is a matter of world-wide importance. In no process is the waste so enormous as in the reduction of metals, especially of the previous metals, producing great losses by excessive volatilisation and the mechanical dispersion of the finer particles. I have long thought that defects of this character could be avoided, and when Mr. Probert first went out for the Richmond Company I asked his especial attention to the subject of improving the furnaces, which at that time were distributing metallic dust rich in gold all around the works; he has reduced this loss to a great extent, but I believe there is still great room for improvement, and I think it will be in the direction of supplying the oxygen necessary by other means than the blast of air, and by the use of hydrogen as the chief heating medium. JOHN ELLIOTT.

## **POCKET-BOOK FOR CHEMISTS.**

However good a memory one may have it is always much more satisfactory in matters requiring such absolute accuracy as chemical analysis and allied subjects to be able to refer to some printed record if it be only for the purpose of confirmation, but hitherto this has been in many cases impracticable, owing to the costliness and bulkiness of the necessary works preventing their being placed in private libraries; a complete remedy, however, has now been provided by Mr. THOMAS BAYLEY, A.R.C.S., I.R.E., and the Demonstrator of Chemistry, Analysis, and Assaying at the Bristol Mining School, in the shape of a handsome little pocket volume \* (5 in. by 3 in., and less than 1 in. thick), opening lengthwise, and very conveniently arranged for reference. Mr. Bayley observes that in practice he has often felt the want of a collection in a convenient form of factors, atomic weights, and other useful data, and has, therefore, brought together the matter which in every day practice proved to be useful. There is a valuable chart which shows graphically the strength of solutions of substances in common use, and has the advantage over tables that it renders calculation unnecessary, whereas, unless the numbers found by experiment are identical with those in the tables, which rarely happens, a calculation must be made when the latter are used.

Amongst the tables given are one showing the symbols, atomic weights, and atomicities of the elements, and another showing the atomic weights according to the latest determinations. Further on there is an excellent table of coefficients for salts found in the course of an analysis, by which the amount of the constituent is sought by simple multiplication. There is a table (contributed by Mr. W. Dawson) for the conversion of grammes, and it is to be regretted that the Anglicised form of the word has been adopted, the inconvenience and danger of which is seen on page 246, where there is the rule—"To convert grains per litre into grains per gallon, multiply by 70." From this it follows that there are 70 litres to the gallon. Had the correct orthography "grammes" been used this error would have been impossible. Is the reduction in the next table to grains or grammes? In the case of powerful poisons used in medicine the indolence which suggests the Anglicising might render the chemist liable to trial for manslaughter, since the mere omission of a dot would give the unfortunate patient a dose nearly 16 times more powerful than intended. The comparative table of British and metrical barometers will be very useful, and the same may be said of the tables for corrections for temperature and capillarity. A very extensive table of boiling points, specific gravity, observed vapour density, and solubility of various liquids is given, which will be much referred to; and there is also an excellent dictionary of solubilities. Ample notes are given on specific gravity, gas analysis, water analysis, qualitative analysis and reactions, volumetric analysis, and manipulation. In the table showing the density of water at ordinary temperature the integer 1 must be removed at the top of the second and third columns. The glossary of the most important minerals gives the formula, hardness, specific gravity, crystalline system, and behaviour with acids; and there are tables for assaying, for alcohol, beer, and sugar. Much technological matter is also given relating to potash, soda, sulphuric acid, chlorine, tar products, petroleum, milk, tallow, photography, prices, wages, &c.

The volume contains a vast amount of useful information, and considering the enormous amount of labour involved in compiling, and that it is the first edition, it appears to be fairly correct. It is a work that will soon become a standard companion with chemists, and after revision will be invaluable.

\* "A Pocket-Book for Chemists, Chemical Manufacturers, Metallurgists, Dyers, Distillers, Brewers, Sugar Refiners, Photographers, Students, &c." By THOMAS BAYLEY, Assoc. R.C.S.E. L. London: E. and F. N. Spon, Charing Cross.

## **POST OFFICE LONDON DIRECTORY.**

Scarcely a year passes without some improvement being introduced in the Post Office London Directory, although each edition appears to be as near as may be perfect; and the volume just issued—the 80th annual edition,\* that for 1879—forms no exception to the rule. The constantly increasing size of London, and the supposed objection of having a directory in two volumes, necessitates various devices for keeping down the size whilst adding to the contents. The improvement this year consists in so folding the map that any part can be referred to without unfolding the whole; in the entire recomposition of the Commercial Directory in somewhat smaller but extremely clear type, with old faced figures, so that the 135,000 names of firms and individuals included in it are compressed into 680 pages. The district comprised has also been somewhat enlarged, so that at present the whole of that vast manufacturing district which has sprung up in the vicinity of the Victoria Docks is included. The Trades and Professional Directory has also been improved in several important particulars, not the least of these being the insertion of a complete list of the members of the Stock Exchange, embracing not only those who have separate offices in the City, but also those who merely deal in the House; there is likewise a separate list of dealers in stocks and shares who are not members of the Stock Exchange. To a large number of the readers of the *Mining Journal* these lists will be of considerable value. A glance at the new trades introduced each year is not uninteresting, although sometimes the titles taken by individuals to indicate the business in which they are engaged appears scarcely necessary, and not very explanatory. This year, for example, there is the trade of geological engineer introduced, the individual practicing it being D. T. Ansted, of Westminster. It can scarcely be supposed that such a calling would be claimed by either an inspector of mineral properties or a mining engineer, yet the only other occupation to which the new term could be considered applicable would be to one who creates or designs geological phenomena where they have not previously existed. In connection with the inspection and reporting on mines, the new geological engineer cannot claim to be the first who has adopted the calling, although he may have fully entitled himself to

\* The "Post Office London Directory for 1879." The 80th annual publication. London: KELLY and Co., Great Queen-street, Lincoln's Inn Fields.

the designation. Asbestos steam packing makers, decorated tinplate manufacturers, hydro-carbon engine manufacturers, ocarina makers, oxide of iron merchants, &c., are also among the new trades this year, although some of them only include a single name.

The several portions of the Directory are so familiar to all men of business that it is almost needless to refer to them; but with regard to the Street Directory, Messrs. KELLY put in a reminder of its application which is worth repeating—it will assist in deciphering illegible signatures. This reminder ought to serve as a hint to many writers who send communications to the press, since it constantly happens that individuals who are able to write the body of their letters in a decipherable character conclude it with a hieroglyphic, intended to represent his name, which is positively disgraceful to anyone who has received any education whatever. At the commencement of the work is a list of commercial stamp duties, a list of the Chambers of Commerce in England, as well as of the Chambers of Agriculture and Trade Protection Societies, and an almanac; whilst for the convenience of those who can dispense with some portions of the Directory, or who prefer it in several volumes, Messrs. KELLY have arranged to issue the Streets, Commercial, and Trades at 12s. each; the Court at 5s.; the Banking at 3s.; and the Conveyance at 4s., so that those requiring a particular class of information can readily have it upon reasonable terms. Of the character and workmanship of the Directory it is unnecessary to say more than that it is in every respect equal to its predecessors; it is an admirable and indispensable requisite in every office.

## **THE STEAM-ENGINE.**

There are few scientific subjects of more general interest to practical men than applied mechanics, and the particular branch which relates to the steam-engine has an attraction with everyone. The history of the steam-engine and its development from the time of Watt is admirably given in the "Text-Book of the Steam-Engine,"\* by Prof. GOODEVE, of the Royal School of Mines, which has just been issued. Commencing with an account of the steam-engine as it existed in the time of Watt, and of the ideas then prevalent as to the nature of heat, Mr. Goodeve gives a summary of some physical properties of steam, and next enters upon a thorough investigation of the principles of the modern theory of heat in its application to the steam-engine. Subsequent chapters deal with the conversion of motion, the expansion of steam, the action of valves. In the fifth chapter an extremely clear and useful account of the indicator and its construction is given, and as this is a subject upon which many have very involved notions Mr. Goodeve's explanations will prove of great value. His explanation on the character and properties of the slide valve, and the object and effect of lead and lap, also conveys a large amount of information.

In the chapter on boilers he commences with the Cornish boiler, very truly remarking that it stands first in the history of the subject, having been adopted in Cornwall in the early part of the present century, and being, in fact, the type from which the Lancashire boiler has been derived. Mr. Goodeve next discusses the considerations which influence the forms of boilers, and then explains how the strength of cylinders under internal pressure may be mathematically ascertained. In the seventh chapter the compound cylinder-engines of Woolf, of Sims, and McNaught, and others are described, and diagrams are given which make the explanations especially clear. The concluding chapter refers to miscellaneous details, and embraces information as to the regulation of an engine, Giffard's injector, and link motion for reversing an engine. The illustrations, which are of the character usually drawn on the blackboard, are so numerous that almost as much instruction could be obtained from the book as from listening to the lecturer himself. Mr. Goodeve's Text Book is a work of which every young engineer should possess himself, as there are few which in a similar space would give him such an abundance of useful facts.

\* "Text-Book on the Steam-Engine." By T. M. GOODEVE, M.A., Barrister-at-Law, Lecturer on Applied Mechanics at the Royal School of Mines. London: Crosby Lockwood and Co., Stationers' Hall-court.

**COLLIERY MANAGER'S POCKET BOOK.**—The tenth annual edition of Mr. W. Fairley's Colliery Manager's Pocket Book, Almanac, and Diary (London: Hutchings, Hutton-street and Colliery Guardian Office) has just been issued, and is fully equal to its predecessors; it contains a vast amount of information likely to prove useful to those for whom it is intended. There are a large number of facts and figures which although they may have been carefully learned cannot be recalled to the memory with sufficient certainty to be availed of, and in such cases it is convenient to have a pocket book of this kind to refer to. In connection with miners' safety-lamps, for example, there is an interesting table showing the number of the lamps required to produce the light of one standard candle—Mr. Fairley states that it requires 8 Davy lamps, 18 1/2 Stephenson's, 2 1/4 Upton and Roberts, 4 1/2 Clanny's, 3 1/2 Mueseler's, 2 1/2 Parish's, and 2 common miners' candles of 30 to the pound. He also gives the common names of certain chemicals, showing that the common name of nitric acid is aqua forte; of chloride of sodium, common salt; of bisulphide of tin, Mosiac gold; of acetic acid, vinegar; and so on. The value of the work is much enhanced by the diary and calendar, which are required constantly in the pocket, being bound separately from the larger tabular portion which is more commonly required in the office.

**FEEDING FUEL TO FURNACES.**—An improvement in Frisbie's feeding apparatus, patented some ten years since, has been invented by Mr. F. HUTCHINSON, of Grimston, York, which consists essentially of a feeding box in which the fuel to be fed to the furnace is charged. This feeding box is carried by a shaft, and by the motion of the feeding box upon its shaft it can either be brought immediately under the opening in the bottom of the furnace, or turned aside from that position. The said feeding box has a moveable bottom, and when the said feeding box, charged with fuel, is brought under the opening in the furnace the moveable bottom of the said feeding box is raised, and the fuel contained in the said feeding box introduced into the furnace. As the feeding box is turned from under the opening in the bottom of the furnace the said opening is closed by an apron or curved plate attached to the rear of the feeding box, which plate passes under the opening in the furnace as the feeding box retires from the said opening. In the original apparatus the feeding box was charged with fuel by manual labour; in the improved arrangement it is self-feeding. Mr. Hutchinson places, by preference, in front of the furnace a hopper or chamber for containing a store of the fuel with which the furnace is to be fed. At the open bottom of the hopper is an inclined shoot or passage, the lower end of which terminates at the curved plane in which the top of the feeding box travels as it retires from under the opening in the bottom of the furnace. To the front of the feeding box is attached an apron or curved plate similar to that at the rear of the said feeding box, the said apron and top of the feeding box being concentric with the shaft on which the feeding box turns. When the feeding box, after having discharged its contents into the furnace, retires from under the furnace it comes under the lower end of the shoot, down which fuel from the hopper descends and fills the feeding box. When the charged feeding box is brought under the opening in the furnace the bottom of the shoot is closed, and the descent of fuel arrested by the apron in front of the feeding box, which apron advances under the bottom of the shoot as the feeding box retires from under it. By the construction and arrangement of parts described the charging of the feeding box is effected automatically, the retreating motion of the feeding box from under the opening in the furnace effecting the filling of the feeding box with fuel ready for its next advance under the opening in the furnace.

**HOLLOWAY'S PILLS.**—This purifying and regulating medicine should occasionally be had recourse to during foggy, cold, and wet weather. These pills are the best preventive of hoarseness, sore throat, diphtheria, pleurisy, and asthma, and are sure remedies for congestion, bronchitis, and inflammation. A moderate attention to the directions folded round each box will enable every invalid to take the pills in the most advantageous manner; they will be taught the proper dose, and the circumstances under which they must be increased or diminished. Holloway's pills act as alteratives, aperients, and tonics. Whenever these pills have been taken as the last resource the result has always been gratifying. Even when they fail to cure, they always assuage the severity of the symptoms and diminish the danger.



## Mining Correspondence.

## BRITISH MINES.

**ABERDAUNANT.**—8. Toy, Dec. 11: The deep adit cross-cut is now driven north 4 fms. 5 ft., where we have cut through the north lode; it is 8 ft. wide, full of sulphur throughout, but poor for lead. The forebrest is now into clean kilas, not so hard for driving and discharging a little water.

**ABERLYN.**—John Roberts, Dec. 11: We have made good progress this week in the rise in the back of the deep adit. We are rising now in the shale, which we have just cut into, which underlies the course of blende, leaving the body of the blende lode to stand. As far as we can now see of the lode it is getting to be much of the same quality and character as the lode in the No. 2 adit—good blende, with stones of lead in it. The No. 2 adit driving south to meet the top of the rise is much the same character as last week, only having stronger pockets of lead. The winze in the bottom of the No. 1 adit is without change. The contractor completed the building of the crusher-house yesterday, and we shall get on the roof directly. The severe frost and snow militates very much against the progress in our surface work.

**BETWIS-Y-COED.**—H. T. Haley, December 12: Setting Report: To drive the shallow adit east, by two men, stent the month, at 4s. per fathom; this end is doing much better than the other, now stent 1 ton per fathom. To drive the deep adit east, by six men, stent 6 fathoms, at 40s. per fathom; the lode in this end has been disordered, and is now worth 15 cwt. per fathom, and I think will further improve as we get away from the disordered ground. To drive on the north branch in the deep adit, by four men, the month, at 32s. 6d. per fathom; the lode worth about 10 cwt. per fathom. To stop the end of the winze, by two men, the month, at 27s. 6d. per fathom; this stop is looking well, worth 25 cwt. per fathom. The pumping wheel is now started, and works most satisfactorily. I hope to get the crusher and dressing machinery at work very quickly, and from the heap of ore already at surface, and the general appearance of the mine, I think good and strong returns may be expected. The weather for the past few days has greatly impeded our surface work, but I hope it will soon moderate.

**BLUE HILLS.**—S. Bennett, P. Bennett, Dec. 7: The Blue Burrow shaft has just passed through as we suppose a portion of the principal gossan, which lies between this shaft and the 30 east, and which we are daily expecting to intersect. The north lode in the 30 east end continues very promising, and worth 7s. to 8s. per fathom.

**BOJOLIS.**—H. Hotchkiss, Dec. 11: Beyond a further slight improvement in the appearance of the lode in the 45 end I have nothing new to report this week. The ground in the engine shaft is more favourable for sinking, and the men are making good progress.

**CLAM ENLINA.**—J. Roberts, Wm. Sandoe, Dec. 11: We have completed cutting the ground in the water-wheel pit, and are only now awaiting a change in the weather to commence building the masonry on the top of rock to carry the frame stones, lime, &c., being ready on the spot. We have removed the steam-engine, and everything about the shaft so as to put in a new bob, as the old one was not only too small for the new work but also rotten. We shall finish straightening the shaft in the next week, and be ready for sinking work forthwith.

**COMBARTIN.**—T. H. W. T. Combs, Dec. 12: There is no particular change in the 15 end or the adit cross-cut since last reported, but we are pleased to say there is a substantial improvement in the lode in the north-west adit end, where the lode is about 2 ft. wide, with veins and seams of good lead and blende throughout, which we are saving for dressing; there is not enough to value, but it has all the favourable appearances for a further improvement, which we hope to meet with shortly.

**COURT GRANGE.**—James G. Green, Dec. 11: I am sorry to say that everything is from ground, and in consequence dressing is totally suspended; it is the severest winter, so far, experienced, and we have about 12 tons of ore ready, and would have the 20 tons ready by time for selling.

**DE BROKE.**—J. Phillips, Nov. 11: We have had more than 12 tons of hard frost, so that nothing has been done at the 55 of any consequence since the report of the 4th inst. The stop in the back of the 25 east is producing 35 cwt. of lead ore per fathom, and the stop in the back of the 35 east and west of the winze from 18 to 20 cwt. per fathom. We have with some difficulty kept going one of the pumping-wheels; the weather, however, is changing.

**DEBIGHSHIRE CONSOLIDATED.**—R. Prince, A. Francis, Dec. 12: There is an important change taking place in the 12 west; a strong rock of water is issuing from the forebrest, and other indications, and lead us to have a little doubt about shortly making a great discovery here. To morrow we hope to commence sinking below the 80, where there is a good breadth of ore ground. We have sent off a further lot of lead ore this week.

**DERESBY CONSOLS.**—John Roberts, William Sandoe, Dec. 11: There is no change this week in the end, which is being driven west towards Cobblers' lode, with the exception of the lode opening a little wider.

**DERESBY MOUNTAIN.**—J. Roberts, W. Sandoe, Dec. 11: Being anxious to see something more of the lode in the bottom of No. 1 level, as the lode in the end was pinched rather small, we put the men to sink a little where we believed there was a good branch of lead gone down, and we are pleased to say that as far as we can yet see our views are fully confirmed. The lode improves every foot we sink. To-day we have taken out stones of solid lead, 1 cwt. in a stone, from the very bottom.—No. 3 Adit: In the rise, during the last month, we raised by two men from 4 to 5 ft., the lode averaging in size about 2½ ft., and producing good work for the dressing-floors, and continues at present quite as good.—No. 4 level: During the past month we have been raising a good deal of good leadstuf—rather better than for months past, and presenting a very cheering appearance at present. We have cleared up, strengthened, and secured from 3 to 4 fms. in the sum from No. 4 adit to No. 5, and have gone as far as the water will allow us to go for the time being, but we hope that the No. 5 as being cleared will let down the water shortly.—No. 5 Adit: We have cleared and secured in this level during the past month about 11 fms., and raised the top of the No. 3 shaft about 9 ft. to provide for tip-room. The level is still choked full with stuff, but the sides are now tolerably firm, and we hope to make good progress. The Valley shaft on the Gorse heading we have commenced clearing up, and we are now down from 3 to 4 fms. We may remain here that to-day we found a fine rock of leadstuf in the debris, which shows that the old workings had a good bunch of lead, and we are strongly of opinion that the lode will be no less valuable as we go down. The severe frost and snow have retarded our dressing operations, as everything is frozen up.

**DERWENT.**—John Morphet, Dec. 12: I was through the most of our workings yesterday. The 95, east of Jeffrey's shaft, by the side of middle vein, is without change. No. 1 stop in the back and the sides immediately under are worth 16 cwt. of ore per fathom; No. 2 stop is worth 15 cwt.; No. 3, 15 cwt.; No. 4, 16 cwt.; No. 5, 17 cwt.; and the flats, which are hard, 18 cwt. The 93, west of same shaft, is being rigorously pushed; in this end we have stronger vein, and it yields a little saving work. In the back of the No. 1 stop, the 93, west of 17 cwt.; No. 2, has improved to 15 cwt.; No. 3 is poorer, producing 17 cwt.; and No. 4 is also poorer, at present worth 18 cwt. The bargain booked rising and stopping out of workings is poor; here we have risen about enough to enable us to start another stop at the setting next week.—Sun Vein: This vein yields in the 70 east 10 cwt., and the stop in the back 12 cwt. West of shaft the stop over the same level is poor; worth 7 cwt.—Westgarth's Shaft, Middle Vein: The 93 east is going at about the usual rate—1 fathom a week; this end and the 93, west of Jeffrey's shaft, are now within 4 fms. of meeting, and by the New Year, or immediately after, I hope we shall have a thorough connection. The end at present yields ½ ton of ore per fathom, but better ore is standing on the south side of the level. The 74 west is without change. The stop in the back yields 15 cwt. of ore per fathom. The frost is very keen, and a vast quantity of snow is on the ground, thus making dressing, &c., very hinderous. We are, however, persevering as well as it is possible to do under the circumstances.

**DUBBY SYKE.**—W. Vipond, Dec. 6: The end is going on east as usual. There is no change to report in the appearance of the vein. The men have driven this last month 6 fms. 3 ft. 6 in. It is now driven east from the rise altogether 22 fms. 6 in.

**EAST CHIVERTON.**—R. Southey, Dec. 12: The lode in the bottom level (74). I am pleased to say, is looking very well, also good progress is being made in our shaft work. We shall now take the men employed in the bottom level to assist the shaftmen to complete the changing of the new pitwork. All the ground is out for the plungers, and the clisters are in their places, so that a few days now will suffice to fix the new and pull out the old pumps, &c., when we shall commence with all speed to sink below the 74, and in the meanwhile we shall stop the back of the 74, and sink lead to market.

**EAST CRAYEN MOOR.**—Wm. Williams, Dec. 12: The new shaft from surface will be down to the depth required this week; the vein in the bottom has further improved, being fully 4 ft. wide, and worth for lead ore 40 cwt. per fathom. We have this week raised solid blocks of ore about 5 cwt. each. The cross cut south to the parallel veins from the 42 has been extended 17 fms.; driven during the month, 4 fms. 1 ft. 6 in. The ground in the end of the 86 is a little easier to work, the vein being 2 ft. wide, with occasional stones of ore.

**EAST VAN.**—Wm. Williams, Nov. 11: The 70, west of shaft, is driven 14 fms.; we have this month taken the men to cross north at the present end to prove the width and value of the lode, at 80s. per fathom. The cross-cut north at the end of the 25 fathom level west for the north lode is set to six men, at 90s. per fathom.

**ESGAR FRATH.**—Thos. Glanville, Dec. 7: Eastern Shaft: The lode in the eastern shaft, below the 70 yard level, will produce 3 tons of copper ore per yard. The stop above the 70 yard level, west of shaft, will yield 2 tons of lead ore per yard. In the 46 yard level, west of shaft, we are still cross-cutting north through the lode. In my report of the 23rd ult. I informed you we had commenced to drive the 70 yard level east of shaft, and by its appearance thought we should meet with an early improvement. I am glad to say the lode will now yield 2 tons of rich copper ore per yard. We are still driving the cross-cut south to intersect main part of Esgar Frath great lode.

**GAWTON COPPER.**—George Rowe, George Rowe, jun., Dec. 7: The drive of the cross-cut south at the 117 is being pushed forward with all possible vigour; the ground is looking exceedingly kindly, and spotted with good quality yellow copper ore, showing every indication of being near the south part of the lode. The lode in the winze sinking below the 105 is 6 ft. wide, being principally capels, spar, mundle, and ore, worth 15s. per fathom. The tribute department is without change.

**GLASGOW CARADON.**—Wm. Taylor, Wm. J. Taylor, Dec. 10: Elliott's shaft is now down the required depth for the 1-2, and we have commenced to drive a cross-cut south in that level towards the lode, which we expect cannot to drive a stop 3 or 4 fms. off. The cutting of the lode in this deeper level is now an important point. In the 90 east the ground is more favourable, but the lode has not much improved yet, and there is very little change in driving west on the branch. The winze sinking in the bottom of the 78, before the 90 east, is suspended until the end is further advanced down to water. We have now commenced another winze further east, where the lode is worth fully 25s. per fathom. We are still cross-cutting south from the 78 east, where we are meeting small branches, but no lode to value. We are driving a midway level west on a south branch, which is opening good ground, worth 15s. per fathom. The stopes and pitches through out the mine are yielding about their usual quantities of ore, varying in value from 12s. to 35s. per fathom. We sampled yesterday (computed) 2.0 tons of ore, which will be sold on the 19th inst.

**GLENNY.**—R. Rowe, Dec. 10: We are still making good progress in sinking the engine-shaft below the 80, and the lode is still from 4 to 5 ft. wide, with a little more spar and blende than usual, but not yet of any value.

**GORSBDD AND MERLLEYS GORSBDD.**—Wm. Edwards, Dec. 12: Nothing more yet interested in the cross cuts, but anxiously we have been making much better progress. The rise in the 70 west looks splendid; there is a rise of lead going out-

ward over 1 ft. wide, solid, and in our opinion it is a new vein going at the back of the shaft, and, there ore, must be intersected by the south cross-cut. The tributers' bargains have improved this month, and we think our prospects very good.

**GREAT HOLWAY.**—Dec. 12: We have to notice an improvement in the lode at the Garden shaft; the cross-cut has proved its extension, and the contents are both lead and blende. Should this go on as at present it will be a great discovery, for there is not an inch of ground worked on the eastern side. The severe frost has stopped us proceeding with the engine-house, and also the dressing operations. True Blue is looking as well as ever, and your suggestions are having consideration.

**GREEN HURTH.**—Wm. Vipond, Dec. 6: The sump west of No. 1 cross vein is now down 35 ft.; still in hazard, and no water to cause any trouble. If we keep as clear of water as we have hitherto, the four men will not be long in working this down to the limestone, and ones into that position, I think the prospects of the mine will be considerably brighter than they have been for some time past. Two men are still stopping on No. 3 cross vein; it is yielding about 6 cwt. of ore per fathom, and I think we have had a few fathoms of better ground in this than we have had lately. We find the sole of the incline level very difficult to work; the arch is not good to keep, and we have not been able to get as deep as I should like, besides the weather is against us when it stops the wheel. I expect we shall get into a better position with this next week if we can get the pump to work. We have not been able to dress this week; the washer and some of the boys have been partly working the hand-pump, and also doing some repairs in the department of the ground having been considerably easier for driving, and put them to drive the western end at the same level, where the lode is looking very promising, and from its appearance ought shortly to improve. I expect the diagonal shaft will be down deep enough by the end of this month to drive back to meet the 14 from Ender's shaft, so that the water from the diagonal shaft may be sent back at that level to Ender's shaft. As soon as the diagonal shaft is down the required depth we shall cut through and strip down the lode now standing under the footwall.

**HINGTON DOWN.**—Thomas Richards, Dec. 12: Bailey's Shaft: In the 172 east the lode is large and promising, producing 4 tons of ore, or 9s. per fathom. In the 172 west the part of the lode carried is 4½ ft. wide, and contains expel, quartz, and mundle, with some good quality copper ore intermixed. In the stop in the back of the 172 east the lode is worth 7 tons of ore, or 9s. per fathom. In the 160, west of No. 10 shaft, the lode is producing some saving work. In the tributers' sink in the bottom of the 160 the lode is worth about 7s. per fathom. In the tributers' stop and pitch in the back of the 110 the lode is worth 4 tons of ore, or 8s. per fathom. The ground in the deep adit is moderately easy, and fair progress is being made.

**LADYWELL.**—Arthur Waters, Dec. 12: Nothing new has occurred in the mine worthy of notice since my report of the 5th inst.

**LANRWIST.**—Robt. Knapp, Dec. 10: We have placed two men to drive the adit end, where the lode is large and ore throughout, yielding about 2 tons of lead ore per fathom. I have removed two men from the 10 east, and put them to drive the western end at the same level, where the lode is looking very promising, and from its appearance ought shortly to improve. I expect the diagonal shaft will be down deep enough by the end of this month to drive back to meet the 14 from Ender's shaft, so that the water from the diagonal shaft may be sent back at that level to Ender's shaft. As soon as the diagonal shaft is down the required depth we shall cut through and strip down the lode now standing under the footwall.

**LEAD BEE.**—J. A. Ede, Dec. 11: No. 1 shaft has passed through the flat, which is of 5 fms. and surface, and in the box forward to you you will find samples of the product, which I hope will prove satisfactory. At No. 2 shaft, which is ahead fully 500 yards, the outcrop, or surface flat, has been intersected at a depth of 5 fms.; samples have also been forwarded to you. You may rely that these evidences of mineral wealth will prove specially productive and remunerative, even in the immediate future. We have commenced to extend the adit north, on the north and south lode, and I am pleased to add that the vein is fully 5 ft. wide, and composed of all the elements and characteristics of rich and productive mines throughout the district. The surface buildings are being completed, and this branch of expenditure will be in a fortnight.

**LEAD BEE (THE).**—Thos. Davison, Dec. 12: The improvement in the eastern part of mine still holds good. The lode in the 40, east of Howman shaft, being 10 ft. wide, and worth 20s. per fathom; this end is now 14 fms. east of the adit shaft, or 54 fms. east of the old engine shaft, and being on a south lode, is a separate course of ore from anything seen in the western part of the mine. I have always reported that the mine was likely to prove rich eastward in the gully a little ahead of our present working, and I think those reports will shortly be verified. Our dressing operations are idle at present, in consequence of the severe frost.

**LEAD BEE.**—John Gilbert, Dec. 11: The 30 fms. level, west of Gundry's shaft, was driven last month 6 fms. 2 ft.; the lode is 2½ ft. wide, and still worth 1 ton of ore per fathom. We think this end will improve soon, as there are only about 6 fathoms more to come over the rise in the back of the 40. The 40, west of No. 2 rise, west of Gundry's shaft, was driven 4 fms. 5 ft. 6 in.; lode 5 ft. wide, and worth ½ ton of copper ore per fathom. We consider this falling off in value only temporary, as we had to pass through a similar piece of poor ground in the level before for about 12 fathoms in length before we met with the second run of ore ground. The rise in the back of the 40, west of Gundry's shaft, was put up 3 fms. 3 ft.; this rise is up 10½ fms., and the lode is 4 ft. wide, worth 3 tons of ore per fathom, and has been a very good lode for the whole distance, averaging at least 4 tons of ore per fathom. The 50, west of Gundry's shaft, was driven 3 fms. 2 ft.; the lode is 3 ft. wide, and worth 2 tons of ore per fathom. The rise in the back of this level, was put up 3 fms. 3 ft.; the lode is 2 ft. wide, and worth ½ tons of ore per fathom. We have taken these men (until the 40 is far enough west to communicate with the rise) to sink a winze in the bottom of the 90, about 25 fathoms east of Gundry's shaft, on a lode 4 ft. wide, and worth 3 tons of ore per fathom. The 80, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 70, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 60, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 50, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 40, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 30, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 20, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 10, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 0, west of Gundry's shaft, was driven 2 fms. 2 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom.

The 100, east of Gundry's shaft, was driven 5 fms. 1 ft. 6 in.; the lode is 4½ ft. wide, and worth 2 tons of ore per fathom. The 100, west of skip shaft, was driven 5 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and improved to about 1 ton of ore per fathom. The 100, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and producing good stones of ore. Gundry's shaft was sunk 3 feet 6 inches below the 100; these men are also carrying ground for bearers and external plat, top door piece, plunger, pool connection, &c. The 100, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 90, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 80, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 70, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 60, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 50, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 40, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 30, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 20, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 10, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom. The 0, west of Gundry's shaft, was driven 2 fms. 1 ft. 6 in.; the lode is 4 ft. wide, and worth 3 tons of ore per fathom.

**MINERAL CORPORATION OF GREAT BRITAIN (HAFNA MINE).**—Wm. Bennett, Dec. 11: No. 1 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 2 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 3 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 4 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 5 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 6 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 7 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 8 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 9 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom. No. 10 adit is set to four men, 4 fms. stent, at 110s. per fathom; the lode in the end 4 ft. wide, composed of gossan, carbonate of lead, and sulphur ore, worth 15s. per fathom.

**MONYDD GORDU.**—James G. Green, Dec. 11: Setting Report: The 34 to drive west, by six men, at 80s. per fathom; no change in notice in this end since I last wrote, ground easy for progress. To sink a winze in the western end of the 24, to sink men, at 5s. per fathom; lode worth 1 ton per fathom. To cross-cut south to the 12 west, to sink two men, at 110s. per fathom; this cross-cut is intended to prove the south counter lode at this level (the 24). To stop the back of the 24 on junction, to 10 men, at 6s. per fathom single measure; lode worth on an average 1½ ton per fathom. To drive the 12 west, to two men, at 4s. per fathom; lode large, but of no value. I, however, think this level should be extended to the point where ore has been found near the surface, by the hedge. To stop the back of the 12, on main lode, to six men, at 6s. 6d. per fathom single measure; lode improved, worth 12 cwt. per fathom. We have about 3 fms. more backs over this to stop, and it is important to get it through as quickly as possible, to enable us to have the accumulated stuff for dressing. To tram and fill all the stuff in the mine, to four men, at 4s. 3d. per score skipsload. You will observe that all the above prices are exceedingly low. This fact is owing to the plentifulness and cheapness of labour. Everything at surface is frost-bound since yesterday, and dressing, in consequence, totally suspended. We shall, therefore, not have the sampling ready in the time specified.

**MORFA DU.**—T. Mitchell, Dec. 12: We have this week removed the bottom end men to assist in holing a piece of ground between the adit and 38, in order to make a convenient place for stopping, consequently we have not raised much blende-stone this week; we have about 4 fms. to drive, and hope to complete this early next week; at which place we shall be able to raise a good quantity of ore. We have commenced leading a vessel with bluestone.

**PARYS MOUNTAIN.**—T. Mitchell, Dec. 12: We have some sulphur-mundle and peach, with rich strings of copper ore coming into the 80 south to day. The ground is undergoing a favourable change, and the forehead is presenting a very promising appearance. We hope this favourable change will lead to something good shortly.

**PENHALLS.**—S. Bennett, P. Vian, Dec. 7: There has been no lode taken down in the 70 east end since last week; the lode therefore must be quoted at 7s. per

fathom, as before. In the 60 east end, on the north part, it is worth 6s. per fathom. The 55 east is worth 7s. per fathom, and the 48 west 6s. per fathom.

**PENNANT.**—Dec. 12: We have 20 men engaged underground on the south lode, 10 out of these stopping. In the 40 yards level good progress is being made with the driving; the lode is well defined, producing some nice ore. From the general appearance I think we shall open up a good productive ground; it looks very well now. We have not yet intersected the lode in the 20 cross-cut, but we expect very shortly to do so. Our prospects generally are most improved.

**PRINCE OF WALES.**—John Andrews, Dec. 11: The tributers in the back of the 24 are going on much as usual, but there is no change whatever in the pitch calling for remark.

**ROMAN GRAVELS.**—A. Waters, Dec. 12: The new south engine-shaft, sinking below the 110 by nine men, at 30s. per fathom; now down 4 fms. 3 ft. below the 110. The 110 to drive north of shaft by six men, at 12s. per fathom; lode worth 2 tons of lead ore per fathom. The same level to drive south of shaft by six men, at 12s. per fathom; worth 15 cwt. per fathom. The 95 to drive south of shaft by six men with machine drill at 9s. 10s. per fathom; worth 2½ tons per fathom. No. 1 stop in back of this level, north of Tiltley's winze, by four men, at 5s. 6s. per fathom; worth 3 tons per fathom. The stop in back of ditto, south of Tiltley's winze, by four men, at 5s. 6s. per fathom; worth 1 ton per fathom. The stop in back of ditto, south of Jack's winze, by four men, at 5s. 6s. per fathom; worth 2 tons per fathom. The stop in back of ditto, south of Dorriest's winze, by four men, at 4s. 15s. per fathom; worth 2 tons per fathom. No. 1 stop in back of ditto, south of the 95, north shaft, by four men, at 4s. 15s. per fathom; worth 3 tons per fathom. No. 2 stop in back of ditto, south of the 95, north shaft, by four men, at 4s. 15s. per fathom; worth 1½ ton per fathom. The 80 to drive south of shaft by six men, at 13s. per fathom; lode worth 1½ ton per fathom. No. 1 stop in back of this level, south of Wilke's winze, by four men, at 5s. 6s. per fathom; worth 4 tons per fathom. No. 2 stop in back of ditto, south of ditto, by four men, at 5s. 15s. per fathom; worth 3 tons per fathom. No. 3 stop in back of ditto, south of ditto, by four men, at 5s. 15s. per fathom; worth 2 tons per fathom. No. 1 stop in back of ditto, north of Wilke's winze, by four men, at 5s. 6s. per fathom; worth 3 tons per fathom. No. 1 stop in back of ditto, south of Matthew's winze, by four men, at 4s. 15s. per fathom; worth 1 ton per fathom. No. 2 stop in back of ditto, south of Matthew's winze, by four men, at 4s. 15s. per fathom; worth 1 ton per fathom. No. 1 stop in back of ditto, north of Powell's winze, by four men, at 5s. 6s. per fathom; worth 2½ tons per fathom. The 65 to drive south of Wilke's winze, south of shaft, by six men, at 12s. per fathom; lode worth 1½ ton per fathom. The winze sinking below this level, south of Stokes' winze, by six men, at 11s. 10s. per fathom; lode for width carried is worth 1½ ton per fathom. The stop in back of this level, south of Stokes' winze, by four men, at 4s. 15s. per fathom; worth 2½ tons per fathom. No. 2 stop in the back of ditto, south of Stokes' winze, by four men, at 4s. 15s. per fathom; worth 1½ ton per fathom. No. 3 stop in back of ditto, south of Stokes' winze, by four men, at 4s. 15s. per fathom; worth 1½ ton per fathom. The 40 stop in the back of ditto, south of ditto, by four men, at 5s. 6s. per fathom; worth 2 tons per fathom. The cross-cut going west from the 40, south, by four men, at 7s. 10s. per fathom. The stop in the back of the 50, south, by four men, at 4s. 10s. per fathom; worth 1½ ton per fathom. The stop in the back of ditto, by two men, at 5s. 10s. per fathom; worth 2 tons per fathom. The No. 3 stop in the back of the 80, south of Glover's winze, by two men, at 4s. 10s. per fathom; worth 2 tons per fathom.

**ROCKHURST.**—Thos. Davison, Dec. 12: In driving adit level east in No. 13 on section until now we have been taking side off, but are now in clear forebrest, and I am glad to say that the place, though hard, looks very well for ore value, 16 cwt. per fathom. We are sinking a winze from the 15 level in south part of vein in order to find some ore, which is said to be left between here and the 25 level; no ore to value yet. There are four men employed in repairing rails and level, east of Glin shaft, in the 25 level in order to stop at the east part of this ground; it will be completed in a day or two. The driving west from winze in No. 7, east of Glin shaft, 5 fms. below the 25 level, is very hard; value, 10 cwt. per fathom. The 50 end east is letting out in several places; the lode is worth 7s. per fathom. Stopping west from same winze in south part of vein, No. 2 on section, east of Low shaft; value, 10 cwt. per fathom. The driving west from bottom of Low shaft is in very hard ground, but the vein and mineral look well; this is in the south part of vein altogether. We are timbering rise up from the 42 level in order to opening out stoping below the 25. The mine, as a whole, is looking better, and I think if we had a few of those new places opened out and put into working order we should be able to raise more ore. We have now on the ground from 6 to 8 inches in depth, and extreme hard frosts.

**SOUTH CONDUIT.**—Wm. Williams, H. Abraham, Dec. 4: The 30, east of engine shaft, has been communicated with the rise in the back of the 40, which has given good ventilation. The 30 east is worth 15s. per fathom. The 40 east is worth 6s. per fathom. The 40 west is worth 6s. per fathom. The lode in the winze in the bottom of the 50 east is worth 10s. per fathom, but we are obliged to suspend the sinking on account of the water. We are forcing on the rise in the back of the 60 east to drain this winze. The rise and stop in the back of the 50 east is worth 10s. per fathom. We have communicated the 50, west of King's shaft, with the 50, east of Plantation shaft; this has well ventilated the mine. The rise in the back of the 50, east of Plantation shaft, is worth 30s. per fathom. The 50 end going west yields low quality first-class. The 70 end, east of King's, is worth 5s. per fathom. The 70 end, west of Plantation shaft, is worth 10s. per fathom for tin. The 70 end west, on the copper lode, yields good stones of ore. The lode in the Plantation shaft below the 70 is worth 9s. per fathom. The 80 end east is worth 7s. per fathom. The rise in the 93 east is worth 11s. per fathom. The rise in the 93 east is worth 20s. per fathom. We shall sell a parcel of copper ore this week.

**Wm. Rich, Wm. Williams, Henry Abraham, Dec. 10:** The rise in the back of the 93 east is worth 18s. per fathom. The rise in the 93 west is worth 11s. per fathom. The 80 end east is letting out in several places; the lode is worth 7s. per fathom. The rise in the back of the 80 east is worth 16s. per fathom. The 70 end, east of King's, driving towards this rise, is yielding low quality tinstone, but we hope soon to have an improvement here. The lode in the Plantation shaft below the 70 is worth 8s. per fathom. The 70 end west of this shaft is worth 10s. per fathom. The 70 end, west of the Plantation shaft, is being driven on the copper lode; this lode is nearly perpendicular, and at the 70 stands some 7 fms. north of the tin lode. The end at present is unproductive, but the ground is moderately easy for driving, and the lode looks promising. We sold last week 27 tons of copper from this lode, at 7s. 6s. per ton. The rise in the 60 end, east of King's, is worth 5s. per fathom. It is intended for the rise to drain the winze in the bottom of the 50, and as soon as it is holed will give good ventilation. The rise in the 50, east of King's, is worth 9s











winion, 1½ to 2½; Hartington Moor, 1½ to 2; Mawston, 50 to 55; Red Rock, 2 to 2½; West Wye Valley, 1½ to 2; Wye Valley, 1½ to 2; Cakemoor, 3½ to 3; South Darren, 1½ to 2; the sale this month is 40 tons of lead ore, realising 575s. The 80 end is worth 30s. per fathom, and the 90 is valued at 42s. per fathom.

**FOREIGN MINES.**—Business here is very restricted. Blue Tent, 2½ to 3; Colorado, 1½ to 2½; Chontales, 10s. to 12s. 6d.; Placerville, 2½ to 2; Cape Copper, 2½ to 3; the directors have declared a dividend of 17s. 6d. per share, free of income tax, and payable on the 24th. Hultafall, 3 to 3½; Eberhardt and Aurora, 3½ to 3; Exchequer, 3s. to 5s.; Frontino and Bolivia, 2 to 2½. New Zealand Kapanza, 10s. to 15s.; since last message the return of gold has been 85 ozs., of which 45 ozs. were from 15 tons of quartz. Malpas, 2s. to 4s.; Port Phillip, 10s. to 12s. 6d.; Richmond, 10s. to 11; St. John del Rey, 275 to 285; Santa Barbara, 37s. 6d. to 42s. 6d.; South Aurora, 4 to 5.

The Market for Mine Shares on the Stock Exchange has been very inanimate, partly owing to much attention having been occupied by the settlement and partly through the temporary improvement in the metal markets having been lost. The Bank of England weekly return is the most unfavourable for some time. Metals of all descriptions are quoted lower; the standard for tin ores has declined 3s., and tin metal is 1s. to 2s. per ton lower; copper is 1s. worse; and lead cannot be sold except at a decline. It had been hoped that the Van der Meer would have shown some improvement, as lead was stated by some to be better; as a matter of fact, however, the prices realised at the sale yesterday averaged only 10s. 3s. 1d. for lead, against 10s. 3s. 9d. last month, whilst the blends only averaged 2s. 11s. 6d., against 2s. 11s. 9d. last month. The rumoured submission of the Amer of Afghanistan is referred to this afternoon as likely to lead to an improvement, but it must be admitted that many who are loudest in their opinion as to the bearing of Indian affairs upon English business would scarcely be able to find Afghanistan on a map of Asia and connect the assumption of the title of Empress with the cause of the war, ignoring the fact that her Majesty was proclaimed Empress of India on Nov. 1, 1858, or rather more than twenty years ago. If, however, the attention which this war has attracted to India in general have the effect of promoting the development of its vast mineral resources, the general will be amply compensated, for there can be little doubt that had the war capital been sent to the mines of India as has been squandered in United States mines by English capitalists there would have been fewer complaints of the loss of both capital and interest. The only mining transactions on the Stock Exchange to date have been in West Chiverton at 1½, in Colorado United at 2, and in Richmond at 10½. The Cape Copper Company has declared a dividend of 1s. 6d. per share.

In referring to the assertion that Mr. Norman Lockyer was alleged to have discovered the method of transmuting metals, it was stated that all that was really proved by the experiments which he had made was that a solution of electrically volatilised copper does not give the same lines in the spectroscopic as a solution of copper not so treated, and that this is all he claims to have done—it is the officiousness of his friends that led to the absurd announcements which have been made. Mr. Lockyer has, it appears, made about 100,000 spectroscopic observations and taken some 2000 photographs in the course of his researches, and from these he has arrived at the conclusion that "the hypothesis that identical lines in different spectra are due to impurities is not sufficient." Before reliable hypotheses can be based on spectroscopic observation the reliability of the spectroscopic under all circumstances must be proved, and the conditions which Mr. Lockyer has drawn must be stronger confirmation than they have at present. And, using technical chemical language, it does not follow because Mr. Lockyer has found unfamiliar lines in the spectra of copper, nickel, and so on, that these metals are necessarily compounds; he must prove that these unfamiliar lines are always seen in the spectra of what we call copper, nickel, and so on, as the variation of spectra may be due to an undiscovered associated metal. In fact, the discoveries of cadmium with zinc and thallium with another metal would be corresponding discoveries—thallium by practically the same process, though subsequently otherwise confirmed. Mr. Lockyer has put on record a vast amount of useful observations, but has wisely left the conclusions to be drawn from them to be hereafter determined.

If shareholders in gas companies had little to fear a month ago, they have less at present, for every fact that came to light with regard to electric illumination is adverse to it. The Raynier lamp is, like the Werdermann, of no practical utility, as upon subdivision of the light its power is annihilated. The attempt to produce light for illumination by incandescence costs ten times as much as by the voltaic arc; and in reporting on the Raynier lamp Fontaine, of Paris, shows that a current which with the Serrin lamp yields 320 units of light (bees Carcel) will only yield 75 units in the aggregate when used in five Raynier lamps, and only 50 units in the aggregate when used in 10 Raynier lamps. It has been stated that when the 11 Werdermann lamps are in use on one circuit only 85 candles light is yielded by each; but this is, perhaps, an exaggeration of its intensity. The new Edison light is described as an iridium platinum incandescence lamp, and is, therefore, 33 years old, and would be less effective than even Raynier's and Werdermann's. An article on the Raynier lamp, in another column, may be interesting.

Richmond, 10½ to 11; the report from the mine, November 20, is encouraging. The mine has been carried on as usual, and with very good results. The rise in the back of the 500 is now up 34 feet in low grade ore. A drift has been started from the rise 55 feet above the 500, and extended 27 feet in good ore. The present end is in very good carbonate ore; this ore body has now been explored to a total depth of 150 ft., and has laid open a large body of ore. The air compressor and other machinery are working smoothly. The reconstruction of the works is being brought to a close; the building is completed with the exception of the corrugated sheet-iron roofing, which they expect during the week. The two new furnaces are ready for work. The machinery is in place, and they are now overhauling the boilers. Everything will be ready by December 1 except flue, which cannot reach from Pittsburgh before Dec. 10. They expected to start about Dec. 15, so a telegram to that effect may be expected during next week.

The Idaho Mine, of Grass Valley, California—a gold-producing property—yielded in gold in October \$47,000. The monthly dividend was paid as usual. This dividend is numbered 111, making a total distribution of \$2,510,000. This mine was offered for sale in England in 1870 for 20,000.

Last Chance, 3 to 4; work is suspended for the winter for want of machinery, but it is intended to resume in the spring, when the winding and pumping work will be erected. The mine known in Utah as Last Chance embraces not only the London company's property but the adjoining property, belonging to Messrs. Tiernan and Watkins, of Salt Lake City, which contains 2400 linear feet in length by 200 ft. in width, and since it was located in 1870 has yielded about \$1,000,000 worth of gold, silver, and lead. The discovery claim of this mine is the dividing line between the two properties. The mine is opened at the discovery by a shaft 450 ft. in depth, connecting with a tunnel run from the side of the mountain for a distance of 250 ft. Intersecting the shaft at the depth of 225 ft. another tunnel, 900 ft. in length, runs from the base of the mountain, connecting with the main shaft at a depth of 450 ft. From this tunnel level drifts have been run of 100 ft., with increasing richness as depth is attained. This makes a total depth of 625 ft. North-east of the discovery, about 300 ft. distant, a similar tunnel has been run from the base of the mountain a distance of 800 ft., where the lode was found and found to be 40 ft. in width. From this point to the surface would be about 75 ft. On the surface there are several inclines and shafts, with a number of cross cuts, all showing a strong, well-defined lode, varying in width from 25 to 50 ft. The ore from this mine has assayed up in the hundreds in gold and silver. The general average of all the shipments was something over \$100 per ton.

Placerville, 2½ to 2; the sinking of the shaft and winze is steadily pushed on. In the first fortnight of November the shaft had been sunk 17 ft. and the winze 7 ft., the latter going down still in a fine lode. Hydraulic or Gold Washing shares remain unchanged. Blue Tent, 2½ to 3; the superintending's report in another column, as well as an extract reproduced from a local paper, speaks of a blast of 650 kegs of powder exploded with excellent results. This prepares a very large quantity of work which will shortly be recommenced.

Hultafall, 3 to 3½; the last report from the mine is said to be satisfactory, and the dressing of the lead and blende a success.

Lead Mine shares have received very little attention, and have naturally been adversely affected by the decline which has taken place in other markets. Quotations are altogether nominal. Van, 18 to 19; the usual monthly report appears in another column of the Journal. There is but little change recorded at the mine. The usual four weeks sale took place on Thursday—500 tons of lead and 150 tons of blende, and realised 5483s. 15s. Grogwinion, 1½ to 2; no fresh news from the mine since last report, except that the frost is severe in this part of Wales, and will to some extent hinder dressing operations. Frongoch, 2½ to 2; steam-power being at present in use at this mine the weather does not affect the works. Capital account continues to be received as to progress made, and the mine shows improvement at several important points since the new company began operations. The manager has received instructions to push on his alterations in the system of ruling for both labour and materials. It is said the tributors, between 30 and 40 tons of dressed lead, are making fair wages, and it is intended to let a number of other pitches on similarly favourable terms. The alterations in the machinery, so as to work the mine by water-power, are making good progress.

Caron, 2 to 2½; the parcel of ore recently sold assayed upwards of 79 per cent. of lead and several ounces of silver to the ton. This is considered a good return for a first sampling, as much of the orestuff crushed was of a poor quality, it having been raised from the shallow workings. The ore now being raised from

the deep level is much more concentrated, and altogether richer in character, a capital indication of further improvement at yet deeper workings. The mine never looked better. Red Rock, 2 to 2½; the improvements reported at the meeting maintain their favourable appearance, and a large extent of good stopping ground is being opened up in the bottom levels, both in the eastern and western portions of the mine. The price obtained for the last sale of ore showed a slight advance over the previous parcel, and that, again, was an increase upon the price of the one preceding it.

Wye Valley, 1½ to 2; the mine continues to improve in the bottom level in a very satisfactory manner. Forty tons of lead were sold on Monday, at 9s. 1s. per ton. West Wye Valley, 1½ to 2; the proposed issue of debentures has, it is said, been well entertained. Panty-Mwyn, 3½ to 3; the vein at the Modlyn shaft, which was intersected a few weeks ago, is now worth about 3 tons to the fathom. Operations are being carried on with vigour and energy, and the ore is rapidly accumulating for another sale. Rhyl Alyn shares are quoted at 4s to 4s, and is about to be registered as a limited liability company.

Mineral Corporation of Great Britain, 10 to 11; the report of the manager on the Hafnia Mine continues satisfactory. The lode in the end of No. 1 adit is 4 ft wide, composed of gossan, carbonate of lead, and sulphur mounds. This is considered to be about as favourable an indication for a permanent lead deposit as could be desired, and Capt. Bennett describes it as a beautiful looking lode. They are now stopping in this district upon terms which will leave good profits. No. 1 stop, worth 15 cwt. of lead per fathom, is set at 55s. per fathom, 4 fms. stent. This should give 3 tons of lead for the 4 fms., at (say) 8s. per ton, or 24s., whilst the cost of breaking is 11s., leaving 13s. for dressing and getting to market and profit, so that the latter item should be large. No. 2 stop, worth 20 cwt. to the fathom, is set at 60s. for 5 fathoms stent, so that at the same rate there would be about 25s. margin. As to No. 2 adit the manager states that this end is looking better every foot driven, and he expects a good improvement daily. The lode in the end of No. 4 adit is at present very disordered by a counter; this he regards as a favourable feature, as there are two or three counters that cross the main lode near the point they are now driving. Capt. Bennett mentions that a shaft has been sunk on the course of the lode about 30 fms. west of the present end, and one of the last men who worked therein tells him that there is a good lode of lead in the bottom. The manager considers that altogether the mine is looking well.

Devon Great Consols, 17. 12s. 6d. to 17. 17s. 6d., and in demand. A correspondent writes that "among the shareholders there appears to be a firm determination to have a considerable reduction made in the heavy expenditure at these mines, not only by the lessening of unnecessary hands and reduction of wages throughout, but in the management generally, as set forth in Mr. Stewart's letter, published in the Journal of last week. There can be no question that the shareholders' urgent wishes should have the immediate attention of those in authority to see that the reduction shall be carried out, in view of the present great depression and the monthly loss."

Subjoined are the closing quotations:—

Ashton, ¼ to 1; Devon Great Consols, 1¼ to 1½; East Caradon, ¾ to ¾; East Van, 1½ to 2½; Glenroy, ¾ to ¾; Great Laxey, 17½ to 18½; Leadhills, 1½ to 2½; Marke Valley, 1½ to 1½; Parys Mountain, ¾ to ¾; Pateley Bridge, 2½ to 3; Penrithal, 1½ to 1½; Roman Gravel, ¾ to ¾; Tankerville, 2½ to 3½; Tintoff, 7 to 9; Van, 17 to 19; West Chiverton, 1½ to 2; West Pateley, 1½ to 2½; Wheel Grenville, 2 to 3; Almada and Tiritio, ¼ to ¾; Birdseye Creek, ¼ to ¾; Blue Tent, 2½ to 3; Cape Copper, 2½ to 3½; Cedar Creek, 1-16ths to 3-16ths; Chontales, ¾ to ¾; Colorado United, 1½ to 2; Don Pedro, ¾ to ¾; Eberhardt and Aurora, ¾ to ¾; Exchequer, ¾ to ¾; Flagstaff, ¼ to ¾; Frontino and Bolivia, 1½ to 2½; Hultafall, 3 to 3½; Javali, 4s. to 6s.; Kapanza, ¾ to ¾; Last Chance, ¾ to ¾; New Quebec, 1¼ to 1½; Otago Enterprise, 1 to 1½; Redross, 2s. 6d. to 3s.; Placerville, 2½ to 3; Pumas Eureka, 2½ to 3; Port Phillip, 9s. to 11s.; Richmond Consolidated, 10s. to 11; St. John del Rey, 275 to 285; Sierra Buttes, 1½ to 1½; South Aurora, 4 to 5; United Mexican, 2½ to 3½.

**COLLIERIES.**—Business in these shares is very dull, or perhaps it would be more correct to say utterly stagnant. It is true that the condition of the coal trade of the country is decidedly bad, but it might be worse, and it is not only quite as good as that of many other branches of trade, but gives far greater promise of early recovery. There is no want of demand for fuel either at home or abroad, and when it is found that the week's export of coal from our chief ports reached 264,339 tons (about 54,000 tons above the previous week), it must be evident that no stocks of coal are accumulating. On the other hand, though a few good collieries are even now making fair profits, the general prices of fuel are ruinously low, and hence it is not so much a lack of business as a want of fair profits of which coal producers have to complain. So long, however, as stocks are kept down by the combined demands of home and foreign customers a slight improvement in general trade would immediately reflect favourably on the coal trade. We are sorry to note that the result of the winding up the Chatterley Iron Company has been confirmed, the cause of the failure appearing to be due to the purchase of large works without providing sufficient capital to carry them on. So closely are the coal and iron trades of this country related that the failure of a large concern like this cannot fail to be a source of regret to all interested in colliery matters.

It is satisfactory to learn that the large new engines at Chapel House Colliery are now in full working, and are raising about 100 tons of coal per day from the Park seam. This is a considerable addition to the previous raisings, and is the more encouraging inasmuch as it is only the beginning of a very large increase in the company's output. Prices on the share market remain quiet. Chapel House at 3 to 3½; Carlisle and Swans, ¼ to 1; Newport Abercrom, 4 to 4½; Thorp's Gawber, 1½ to 2; Altam, 3 to 3½; New Sharlston, 3 to 4.

\* \* With this week's Journal a SUPPLEMENTAL SHEET is given, which contains: Original Correspondence: Miners' National Relief Fund (Ellis Lever); Boiler Explosions (Henry Heller); On Consumption of Fuel in Mining Engines; Chontales Mining Company (W. B. Palmer); American Iron (Fe) Ore; Progress in Canada—the National Policy; Investments in Foreign Mining; Ore-Dressing Machinery (G. W. Baker); Finance, Manufacture, and British Mining (R. Trefinnick and Co.); A Contract—or which Pays Best?; the Great Northern Railway (W. J. Thompson); Rock-drilling Machinery (Bathorn and Co., W. Thompson, Cook); Rock-drilling and Air-compressors; Lead and Silver-lead Mines (W. Salmon); Devon Great Consols; Gwynn in Wales—the Gwynn Mine; Cardiganshire Mines—Central Division; the Rookhope Lead Mining Company (Limited)—the Scotch Mining Share Market—Registration of New Companies—Foreign Mining and Metallurgy—The Wild Duck; or, Sportsman's Arms—Meetings of New Quebrada, Bowling's Patent Fitter Press, Glyn, Emma, and St. John del Rey companies, &c.

**GREAT SALES OF COPPER IN LONDON.**—Copper, like most other things, has within the past few months been very much depressed. The directors of the great Wallaroo Company a few weeks ago found it necessary to close one of their principal workings, for the simple reason that the imports into England were unremunerative, and entailed many vexatious disappointments at the auctions. Within the past fortnight some very important movements have taken place, which will rule the whole of the copper trade and its various branches throughout the country until the early spring. The result of public sales would appear to place Wallaroo at 67s. 16s. 9d. per ton. Deer Brothers' ingots have been placed at 63s. 15s.; Burra ingots and plates have been withdrawn at 65s. 10s., a material advance on that quotation being demanded. The stocks at the commencement of the present year were—in England 30,031 tons, in France 8917 tons—making a grand total of 38,948 tons. About 3000 tons of Corocoro Barilla, in Havre, have been sold to the French smelters. The market in London is quiet; g.o.b. Chili bars are quoted at 58s. 10s. spot. Messrs. James and Shakespear, of Liverpool and London, offered some 578 tons of Wallaroo copper in cakes, and the following was the course of the bidding:—Copper per City of Agra opened at 63s. 10s. per ton, advanced 12s. 6d., 15s., 17s. 6d., and was finally knocked down at 66s., the lot being about ten cakes. Messrs. Merton were the buyers. Then followed nine lots, in about 10 tons cakes, to the same buyers, at 66s. 17s. 6d., the price having been run up in gradations of 2s. 6d. from 66s. 2s. 6d. to that figure. The next start was at 66s. 17s. 6d., the last bid, when an advance to 67s. occurred, and then the price was forced up by half-crowns to 67s. 7s. 6d. The next try, at a lot of 10 tons cakes, was at 67s., finishing at 67s. 7s. 6d. The next was at 67s., and here the improved tone of the copper market asserted itself. Messrs. Brandies were buyers of some 30 tons of cakes, at 68s., and Messrs. Wolff took a lot of 10 tons at the same price. There was some sharp competition over lot 20, consisting of about 7 tons cakes, which started at 66s. 17s. 6d., and ultimately fell to Messrs. Merton, at 67s. 15s.; as did also lot 21 of 10 tons. Lot 22 went at 68s., the next two lots, of 10 tons each, fell back to 67s. 17s. 6d. Mr. Sargeant was the next purchaser at 67s. 17s. 6d.; then followed Messrs. Brandies and Messrs. Merton at 68s., and then Messrs. Merton bought very heavily at 68s. 2s. 6d. Messrs. Gillmore took lot 55, at 68s. 10s.; and Messrs. Merton brought a very successful sale to a close by taking the last lots of about 31 tons at 68s. 7s. 6d.

**PONTOBAUD SILVER-LEAD MINING AND SMELTING.**—At the ordinary general meeting held in Paris, on Nov. 30, the reports and accounts for the year ending June 30, 1878, were received and approved. The profit on the mines and smelting works had amounted to 19,410. 13s. 1d., adding to which 2582s. 5s. 11d. for interest and discount, and 4103s. 15s. 6d. profit on securities realised, the total gross profit was 26,796s. 14s. 6d. The various sums written off plant, &c., and the royalties and estimated loss on stocks of purchased ore absorbed 937s. 10s. 10d., leaving the sum of 17,425s. 3s. 8d. as the net profit of the year. The dividend for the year was fixed at 40 frs., of which 15 frs. was paid on account in June, and the balance of 25 frs. (or 19s. 9d.) per share is now in course of payment at the offices of Messrs. John Taylor and Sons. The report of Messrs.

John and Richard Taylor, the engineers-in-chief of the company, alluded to a falling off since June in the discoveries of ore in two of the mines, but stated that very satisfactory results had been obtained at the smelting works. The low prices of lead and silver-lead much affected the company's profits.

**MAWSTON LEAD MINING COMPANY.**—At an extraordinary meeting of shareholders, held on Dec. 2, it was resolved to divide the existing 24 shares, of 50s. each, into 1200 shares of 1s. each, and to increase the capital to 1800s., by the issue of 600 new shares of 1s. each. The manager reported that the 22, between Wendley Hill and Mawston shafts were now driven about 110 fathoms, and that good ore had been passed through in several places, which is steadily improving, and that the prospects are considered very good.

**HARTINGTON MOOR LEAD MINING COMPANY.**—At an extraordinary meeting of shareholders, held on Dec. 2, it was resolved to increase the capital of the company from 600s. to 1200s., by the issue of 600 new shares of 1s. each. The manager reported that the main engine-shaft was down 24 fathoms, and that other works were progressing satisfactorily.

**LEAD MINES—LEAD SMELTERS.**—We stated last week, from information received from a reliable source, that the prices of lead had advanced in America. We have heard this week from the United States that lead a few months ago was selling at about 14s. to 14½s., and that such a great demand has there set in, the price has advanced to 16s., 16½s. 10s. per ton. We shall, no doubt, see a much better price for English lead and ores. We hear that one or two new smelting firms are in course of formation. The general impression is that the lead smelters can well afford to give at the very least 1s. to 1½s. per ton more for lead ore than they are now doing. Any new smelting firms now coming into the market are sure to realise handsome profits.

**ISABELLE GOLD AND SILVER MINING COMPANY.**—The following memorandum, dated Dec. 12, has been issued:—"The manager telegraphs us that he has started for mines. The directors consequently desire to inform the shareholders that ere this the tunnel will have been commenced."

**A LARGE MAKE OF BESSEMER STEEL.**—We understand that at the Bessemer Steelworks recently erected by Messrs. Tannett, Walker, and Co., of Leeds, for the Rhymney Iron Company (Limited), Rhymney, under the superintendence of Mr. Lybourne, the company made during last week (working ordinary shifts) the large quantity of 1217½ tons of steel. The company can make with ease week after week about 1100 tons with two converters.

**ACCIDENTS IN COAL MINES.**—Prof. Ansted, F.R.S., in a lecture on the subject of "Accidents in Coal Mines," said that a great many of the so-called "accidents" occurring in mines might be prevented by proper supervision; and there was no doubt that, in this respect there was a great improvement on the state of things which existed a few years ago. It was admitted utterly impossible to do away with all accidents and calamities. Where a large number of men were employed within a small area at the same time, where there was elaborate machinery throughout a great mine, often extending for 1000 acres, and worked in galleries extending, perhaps, for miles where frequently 500 or 600 men have to go up or down the great shafts of the mine, and thus, during their passage, preventing the free rush of fresh air throughout the works, it was not to be wondered at that accidents should occur. Then, besides, the shafts were used for bringing up the coal. The whole of these operations, Prof. Ansted remarked, should be carried on under the most unceasing vigilance and the most constant care. The chains might break, or something else happen to the machinery; indeed, very few days passed without something wrong occurring in connection with the mechanical arrangements; and it was well known to those acquainted with the working of mines that a number of human lives were annually lost in this way. Prof. Ansted pointed to the fact as a cheering one, that although the consumption of coal had enormously increased during recent years, the number of accidents had by no means increased in proportion. He hoped, in conclusion, that the time would shortly arrive when, putting the present method of lighting coal mines aside, the electric light would be brought into requisition, and a boon conferred upon the poor miner by giving him a sufficient light while engaged at and removing the dangers connected with his avocation.

**Obit.**—Mr. THOMAS BRABAN ROSS, aged 36; engineer, Sheep-bridge Ironworks, Chesterfield. Formerly of Gateshead. His estimable qualities endeared him to all who knew him, and he is deeply regretted.

## ZINC ORES.

**ARMAND FALLIZE,**  
INGENIEUR-CIVIL, A LIEGE (BELGIUM),  
BUYER  
1.—CARBONATED AND OXYDED ZINC ORES (CALAMINE, &c.)  
2.—ZINC AND LEAD ORES MIXED TOGETHER, BUT DRESS-  
ABLE KINDS ONLY.

**CAPPER PASS AND SON, BRISTOL**  
PURCHASERS OF  
LEAD ASHES, LEAD SLAGS, SULPHATE OF LEAD, HARD LEAD,  
BRASS SLAGS AND ASHES, COPPER REGULUS, MATTE, SCORIA,  
TIN ASHES, TERNE ASHES, &c., and MIXED ORES or REFUSE,  
containing LEAD, COPPER, TIN, or ANTIMONY.

**W. M. ALLAN AND CO.,**  
184, BUCHANAN STREET, GLASGOW,  
EXECUTE COMMISSIONS FOR THE PURCHASE AND SALE OF  
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Sole Agents in Scotland for—  
SPEAR AND JACKSON, Etna Steel Works, Sheffield; and  
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Steel and Steel Tools, Pig and Manufactured Iron, Hemp and Wire Ropes for  
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MINE, CARBONATE AND SULPHATE OF BARYTES, ANTIMONY ORE,  
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NEW FERRY, CHESHIRE,  
MINERAL BROKER AND MINING SHAREDEALER.

MINES INSPECTED AND REPORTED ON.

**ENOCH AND RICHARD PARRY.**  
MINING AGENTS AND SURVEYORS,  
MINSTERLEY, SHROPSHIRE.

Mines inspected and reported on at home and abroad.



## Notices to Correspondents.

\* Much inconvenience having arisen in consequence of several of the Numbers during the past year being out of print, we recommend that the Journal should be filed on receipt; it then forms an accumulating useful work of reference.

Received.—"Bristol": We could not allow a discussion upon such a subject to commence—where would it end?—"J. B. R."—"E. L."—"W. W."—"P. E. N."—"Hambler" (Old Treburtet).—"W. H. G." (Market Harborough): See reply to "Bristol."—"Shareholder" (South Condurrow).—"Constant Reader" (Bel-fast).—"Perplexity" (South of Eresby): We have forwarded your letter to Mr. Marlborough.—"Shareholder" (Pondora).—"C. H. S."—"H. S." (Wolverhampton): Full information will appear in the Journal as soon as proceedings are taken—"G. W."

IMPORTANT NOTICE.—REDUCTION OF POSTAGE ON THE "MINING JOURNAL."—In consequence of the new POSTAL CONVENTION, which came into operation on July 1, the postage of the Mining Journal to many countries will be reduced to one fourth. Henceforth the subscription will be £1. 10s. 4d. per annum (29 frs.), postage included, for the following countries. The amount will, if desired, be collected at the subscriber's residence at the end of each year. The subscription continues until countermanded.—Austria, France, Belgium, Denmark (including Iceland and the Faroe Islands), Egypt, Germany, Gibraltar, Greece, Heligoland, Italy, Luxembourg, Netherlands, Norway, Portugal (including Madeira and the Azores), Roumania, Russia, Serbia, Sweden, Switzerland, United States, Malta, Turkey, Morocco, Tunis, and the Canary Islands. Spain £1. 10s. (20 frs.).

THE SUPPLEMENTARY SHEET.—We have received occasional complaints, and of late a good many, that the Journal is delivered by country booksellers without the Supplement. Subscribers would oblige us by demanding that the paper should be handed to them complete, as every Journal is accompanied by the Supplement when it leaves our office, and the fault of omission must rest with the country bookseller or their London agent.

## THE MINING JOURNAL,

### Railway and Commercial Gazette.

LONDON, DECEMBER 14, 1878.

#### OUR EXPORTS—IRON, STEEL, HARDWARE, MACHINERY, COAL, &c.

The Trade and Navigation Returns just issued, so far as our exports for the last month are concerned, are by no means favourable, but taking the year up to the end of November the results are more favourable than might be expected, considering what an outcry there has been as to the general depression prevailing in every branch of industry in all parts of the kingdom. The value of the exports of British and Irish produce and manufactures during last month amounted to 15,961,659*l.*, against 16,753,364*l.* in 1877, and 16,510,627*l.* in 1876, being a decrease of 47 per cent. as compared with 1877, and of 39 per cent. as compared with 1876. The total for the eleven months is 178,143,305*l.*, against 182,811,576*l.* in 1877, and 185,325,348*l.* in 1876, showing a decrease of 26 per cent. only as compared with 1877, and of 30 as compared with 1876. It may, however, be stated as a set-off for the decrease of our exports that there was a decline last month in our imports equal to 194 per cent. in comparison with November, 1877, whilst the falling off for the present year, as compared with the same months of last year, was equal to 61 per cent. In pig-iron Germany and Holland have taken the largest quantities, the former absorbing a good deal in the making of Bessemer, and, singular to say, of late has successfully competed with us in steel rails for continental railway companies. The exports for the year so far have amounted to 864,092 tons, against 824,418 tons for the corresponding months of last year. Like everything else, however, the price of pig has come down, and whilst the average for the present year has been about 53*s.* per ton, last year the rate was 57*s.* 8*d.* per ton, thus showing our ironmasters have had anything but an easy time of it, at the same time fully justifying the reduction in the wages of miners and others. In railroad iron of all descriptions there has been a falling off of late, the principal decline being in iron rails, whilst those made of steel still maintain their position, Russia being the largest buyer, and after her Australia, British India, and British North America. The total of iron and steel rails exported last month was 22,615 tons, against 20,201 tons in November, 1877, and for the eleven months just ended 348,155 tons, as compared with 382,640 tons for the same period of the previous year. Hoops, sheets, boiler, and armour-plates have declined from 183,658 tons for the first eleven months of last year to 178,640 tons for 1878, the decrease being due to the United States, which has taken a very small quantity indeed during the year, whilst Russia, India, and Australia have been the largest consumers. Very little change has taken place in tin-plates, the exports up to the close of November having been 143,914 tons, against 141,121 tons for the corresponding months of 1877, America taking more than one half of all that is sent out of the country.

Cast or wrought iron figures for 232,250 tons this year, against 231,444 tons in the previous one, a large proportion having been sent to Brazil and our own colonies. Last month the exports of wrought and unwrought iron were 193,791 tons, of the value of 1,547,422*l.*, whilst in November, 1877, they were 184,748 tons, valued at 1,633,607*l.* Here we have an increase of 9043 tons, but with a decrease in value of no less than 86,185*l.*—a decline equal to 5.3 per cent. for the month. Taking the eleven last months, the quantity of the same description of iron sold abroad was 2,150,075 tons, valued at 17,158,861*l.*, against 2,171,170 tons, of the value of 18,542,880*l.*, for the corresponding months of last year, or a decrease in value of 7.5 per cent. It thus appears that the average price of the iron was fully 10*s.* per ton higher in 1877 than it was in 1878—another significant fact for those who do not believe that all qualities of iron have undergone a most material reduction during the present year. Makers of machinery, all things considered, show to advantage in the returns, the value having advanced from 6,146,692*l.* for the eleven months in 1877 to 6,936,496*l.*—an increase of 12.8 per cent. But, as in other goods, the increase in value does not correspond with the increase in the exports. British India has been our best customer, having taken double the quantity this year to what it did in 1877, whilst more has also been done with Australia, Russia, Germany, and Brazil, whilst there has been a marked falling off in the business done during the present year with Italy. The value of the exports of hardware and cutlery show an increase of 0.8 for the last month, as compared with November, 1877, being the difference between 295,703*l.* and 293,196*l.*. But when the eleven months are taken we find a difference in the opposite direction, for whilst the exports in 1877 were put down at 3,055,700*l.*, those for 1878 were 3,026,989*l.*. It may, however, again be stated with respect to cutlery and hardware that the weight during the present year was heavier than in the past one. Australia has been the largest consumer, taking fully one-sixth of the entire of the exports, whilst the United States comes next, despite the protective nature of its tariffs, and is followed by British India, the Brazils, Germany, and British North America, in the order given.

The exports of coal, cinders, and patent fuel show a falling off last month as compared with the same month of 1877, the quantities being 1,130,580 tons and 1,122,911 tons. Taking the two periods, France fell off from 200,526 tons to 210,999 tons, whilst less was also sent to British India (where coal is now being extensively worked), Brazil, Malta, and Sweden and Norway. A short time since the Spanish Government prohibited the use of British coal in the arsenals of that country, only allowing it to be sold by auction in Cadiz, so that we find during the last month our exports to that country and the Canaries were only 47,568 tons, against 63,075 tons for the corresponding month of last year. On the other hand, there was an increase in the tonnage sent to Italy, Turkey, and Egypt. For the 11 months of 1878 the quantity sent away was 14,381,430 tons, against 14,311,678 tons for the corresponding months of last year, showing an increase of 69,743 tons. A great difference, however, took place in the price, for whilst the smaller quantity was valued 569,744*l.*, the larger one was put down at 515,253*l.*. Last month the average price of the coal, &c., exported was about 9*s.* 2*d.* per ton, and for November, 1877, it was 10*s.* per ton, whilst for the 11 months of the present year the price averaged 9*s.* 6*d.* per ton, and for the same months of last year it was 10*s.* 3*d.* per ton.

The fact that the price of coal is cheaper at the present time than it was several months ago, shows how active is the competition, and how hard pressed our colliery-owners are when they are selling during the winter at prices that can barely pay the cost of raising, so that it is by no means surprising to find them asking their men to submit to a reduction of wages.

#### THE MANUFACTURE OF STEEL RAILS.

Our English makers of Bessemer rails are now meeting with an amount of competition on the Continent to which they were strangers not so very long since, and this is likely to increase to a still more serious extent. During the present year we have exported to Germany about 3000 tons monthly of Bessemer rails, but now the German makers have actually been entering into contracts for them at prices less than they can be produced for in this country, although large quantities of raw iron are exported to Germany. We certainly do not see how German makers of rails can manufacture them so cheap as we can, but that they have taken orders in competition with English makers is now an established fact. At the recent meeting of the British Iron Trade Association this new movement was brought under notice in a letter from Messrs. BOLCKOW and VAUGHAN, in which it was stated that German manufacturers had quite recently obtained several Italian contracts for rails, as well as some for the Portuguese Government, delivered at Lisbon as low as 6*l.* per ton. For some time past we have been sending about 1000 tons of steel rails every month to Italy, but we certainly cannot see how they can be delivered at anything like the price charged by the German manufacturers, with all the advantages we have over them. But the most singular circumstance in connection with our German competitors is that they charge their own Government 7*l.* 10*s.* per ton for the same rails that they sell to others at about 5*l.* per ton. During the early part of the year we done a very fair trade with Spain in steel rails, but of late there has been a great falling off, and, of course, to the advantage of our continental rivals. This is, of course, to a great extent to be attributed to the anomalies of the Spanish tariff and the treaty entered into by that Government with the Belgian and German Governments on the "most favoured nation" principle. The result of that arrangement is that we have been placed at a discount of 20 per cent. with the countries alluded to. That is, English rails are taxed to the extent of 20 per cent. above those of Germany or Belgium.

This, we may say, has some connection with the duties charged by England on Spanish wines of a certain class, but it is to be hoped that an arrangement will be come to by which English rail manufacturers will be placed in as favourable a position as those of any other country. Still, it is evident that if we are to hold our own in the article of steel rails on the Continent everything possible will have to be done to lessen the cost of production. Large quantities of hematite ore are brought from Spain to this country, and there is no reason why its present cost should not be sensibly reduced. The cost of freight, too, is an important item, and efforts should be made to have it lowered, not only by sea, but by railway as well. About a fortnight ago the Bessemer rail makers of Sheffield and the district called the attention of the Midland and Manchester, Sheffield, and Lincolnshire Railway Companies to the necessity that existed for reducing the carriage rate to the Mersey and the Humber ports for rails made by them. The directors have promised to give the matter their most serious attention, and it is to be hoped they will see their way clear to making a reduction that will be felt. The question is a most important one, and the position we have so far held in the continental and other markets as producers of Bessemer rails will require all the energy of our makers to maintain, and the aid as well of all persons interested directly and indirectly in the progress of a trade which, originated in England, is in every sense of the term a British industry.

#### FOREIGN COMPETITION.

Mr. MACDONALD, M.P., hears now so much on all sides about foreign competition in the iron trade that he deems it right to make known his views upon the subject. *Prima facie*, the facts are rather against Mr. MACDONALD, Mr. HALLIDAY, and other prominent champions of Trades Unions. Before they began to unsettle the coal miners and iron workers of South Wales that district was prosperous. Capitalists secured good returns upon their investments, and working men received wages which, judiciously expended, procured them all the substantial comforts of life. Now all is changed, and changed very grievously for the worse. The property of the capitalist has been sadly depreciated, and the wages of the working man have either been materially reduced, or, what is worse still, they have stopped altogether. The Trades Unionism, expounded by Mr. MACDONALD and Mr. HALLIDAY, which was to have brought untold prosperity to the Welsh working man, has landed him, instead, in a sea of troubles, while it has in some cases deprived him of even the bare necessities of life. Now we read of increasing foreign competition, instead of our old industrial supremacy upon the leading markets of the world. Mr. MACDONALD hears so much of this foreign competition that he is fain, through the columns of the Western Mail, to make an attempt to explain it away.

We will give Mr. MACDONALD the benefit of one admission to begin with, and will express our opinion that the importance of Belgian competition has been much exaggerated. There have no doubt been instances in which Belgian competition has been fatal to English ironmasters and English ironworkers, but the success of the Belgians has been confined to some descriptions of iron, and the whole metallurgical production of Belgium is so comparatively limited that Belgian competition cannot amount to very much. But the case is far different with American competition. That is becoming increasingly formidable, and we unhesitatingly affirm that Mr. MACDONALD, Mr. HALLIDAY, and the Trades Unionists are to some extent accountable and responsible for the growth of the Transatlantic competition with which we have now to deal. The Americans saw England's difficulty was America's opportunity; that the disordered and disorganised condition of the English labour market had deprived Great Britain of her old power of cheap production; and that the time had arrived for Americans to make a great and supreme effort to establish a vigorous metallurgical industry of their own. Ten years since large quantities of South Welsh rails and other iron went at profitable prices to the markets of the United States; now these markets are closed to South Wales, to the great and serious loss of that district, and we charge the loss to a considerable extent upon Mr. MACDONALD and the Trades Unionists. Mr. MACDONALD points to the heavy duties imposed by the American Congress upon English iron entering the United States, and argues that these duties show that the Americans still feel themselves unable to compete with us. No doubt the American ironmaster prays protective duties in aid of his operations. But it must be remembered that the United States comprise a vast area; that great distances have to be overcome in the transport of raw materials, and the delivery of manufactured goods; and that labour is not so very readily obtainable for iron-making purposes upon the other side of the Atlantic. What we contend for is the probability that had we continued to deliver iron at cheap rates upon the American markets the Americans would have been content to take our iron for a much longer period. As it happened our iron became dear through the agitation maintained by the Trades Unionists, and the Americans have driven our iron from their own markets, while their surplus iron production is beginning to overflow into other countries.

EDISON'S ELECTRIC LIGHT.—The telegram received during the week from New York to the effect that the essential feature of Mr. Edison's alleged discovery of an improved electric light is the production of the light by the incandescence of an alloy of platinum and iridium affords conclusive proof that the invention is worthless, or rather no invention, since precisely the same method of producing the light was invented 33 years ago, and has, according to Mr. Fontaine, the well-known French electrician, been constantly used in lecture experiments ever since, although it has never given satisfactory results for illumination. If Mr. Edison have produced

a light strong enough to read by with incandescent iridio platinum, and one Daniell cell the size of this cell must have been larger than any yet seen.

MANUFACTURE OF RAILS IN AMERICA.—In 1872 the United States imported nearly 600,000 tons of iron and steel rails for the railway system of the country. Five years later, in 1877, the importation was reduced to 12 tons, the home production in that year having risen to nearly 760,000 tons, or more than the total import in 1871. The total quantity of iron and steel rails manufactured in the United States in the five years ended 1871 was nearly 3,000,000 tons, and in the five years ended 1877 the total production had increased to over 1,000,000 tons.

TIN.—We are indebted to Mr. Thos. B. Provis, secretary of the Mining Institute of Cornwall, for the following returns:—The quantity of tin sold from the undermentioned mines during the month of November was 765 tons 4 cwt. 3 qrs. 10 lbs.—Wheal Agar, Wheal Bassett, West Bassett, Blue Hills, Carn Brea, Cook's Kitchen, South Crofty, South Condurrow, Dolcoath, West Frances, Wheal Jane, Wheal Owles, Pedn-an-drea, Penballs, Wheal Prussia, East Pool, Tincroft, Wheal Uny, Tin Streams.

#### GOLD IN INDIA.

The first portion of the report of Mr. Oliver Pegler of the gold deposits of the South Wynaad district was published in the Journal of Nov. 23, but owing to delay in obtaining the engravings which should have accompanied it has been impracticable to give it complete until now. In its more complete form its value will, no doubt, be appreciated. Of course, the great question which will determine whether the Wynaad deposits can be profitably worked will be the average richness of the reefs, and although as Mr. Theodore Hughes shows a parcel crushed by one company has given 24 dwts. of gold per ton, by another 3 dwts., and by a third 10½ dwts. of gold per ton, the prospects are by no means discouraging. His name not being known as a miner or as a geologist it may be assumed that he is an amateur who has taken a mistaken view of the case, and that being such, such authorities as Messrs. Johnson and Matthey may be taken in preference. It is not at all improbable that in a district like South Wynaad the auriferous ground has been treated as it comes, without any attempt at concentration, and Mr. Hughes should be informed that if this be the case the produce of 24 dwts. per ton leaves nothing to complain of. As it can scarcely be supposed that Mr. Hughes would be bold enough to question Messrs. Johnson and Matthey's accuracy, it may be suggested that there is at least one other conclusion that he might have arrived at. As they obtained nothing below 18 ozs. of gold to the ton, and as some as high as 816 ozs. of gold to the ton, it is evident that by selection none of the rubbish to which Mr. Hughes alludes need be put through the machinery, and the mere circumstance that it has been treated is but a proof of the incompetency of those who have had charge of the operations.

Mr. Brough Smyth, from having been for many years Secretary for Mines at Melbourne, would scarcely be likely to make a favourable report upon a district which was incapable by the application of proper skill of giving any better results than those mentioned by Mr. Hughes; nor would Mr. Brough Smyth be likely to recommend gold miners to work on any reef whatever, regardless of its value. He states, on the contrary, that the yield varies from a few pennyweights to 200 ozs. per ton. Of course no one anticipates that even the average of 100 ozs. of gold to the ton of ore will be reached, but as all know that in South Wynaad, from ½ oz. to 2 oz. per ton would yield large profits, it is not unreasonably concluded that Mr. Brough Smyth's discoveries leave no doubt as to the district being worth attention. More than this cannot be said until Mr. Brough Smyth's report is forthcoming, and which it is hoped will reach this country shortly, but in the meantime the perusal of Mr. Pegler's report, with the illustrations accompanying it, will enable much useful information to be obtained.

#### TIN MINING IN SAXONY.

The Records of the Royal Office of Mines of Freiberg mention that extensive and rich deposits of tin are to be found in close proximity to the village of Ehrenfriedersdorf, situated in what are known as the Erzgebirge of Saxony, which were worked by the ancients as far back as the 14th century, but only superficially, and although prior to 1692 there are no reliable statistics as to the quantity of metal which these mines have yielded, undoubted data indicate that from 1692 to 1876—a period of 184 years—5425 tons of tin have been extracted, without, however, having made any appreciable impression upon the enormous mass of mineral still to be won. Many causes combined to prevent an extraction upon a more extended scale, not the least important being that these mineral fields were divided into a number of small holdings, and the various proprietors were scarcely unanimous in their views regarding the preparation of the ore or the mode of smelting it. The quality of the mineral derived from the various lodes also varied very materially, and it is not, therefore, astonishing that a want of unity of action as to the preparation of the mineral and as to proportions of metal which each owner should receive from the smelting works should prevail.

The present proprietor of the tin mines of Ehrenfriedersdorf purchased in 1872 the whole of these divided properties, and commenced working in a more regular and systematic manner, so as to develop the immense mineral resources of this district, and in doing so he has at his disposition the varied advantages which modern science has opened up. This property is situated only about four miles distant from the Schönfeld station of the Annaberg-Chemnitz State Railway, from which a good carriage road passes the smelting works belonging to the mines, so that the means of transport, whether on the one hand for fuel or on the other for the expedition of the metal, is easy and cheap, and consequently, as coals can be obtained at exceedingly moderate prices at the railway station, the cost of smelting is reduced to a minimum.

These mineral deposits form two distinct but well-defined groups. The situated east and west of the village of Ehrenfriedersdorf, the eastern group of lodes is known as the Sauberg, and the western group as the Freiwald. The Sauberg group comprises eight lodes, nearly parallel in direction east and west; this mine is accessible by an adit—the Sauberg Stolln—about 1½ mile in length, opening upon the Valley of Ehrenfriedersdorf below the smelting works, unwatering the mine, and cutting the mineral, at a depth of about 75 fms., while a new main winding shaft has been sunk by the present proprietor, and connected with this adit, at a depth of about 60 fms. from the surface. The Freiwald group comprises 14 lodes, 10 of which are nearly parallel in direction east and west, whilst four are equally well-defined lodes, crossing the others in a northerly westerly to south-east direction. Three adits have been driven into the Freiwald, the deepest and most important of which—the Leier Stolln—opening upon the Valley of the Greifencreek, though situated 60 fms. above the Sauberg Stolln, cuts the mineral of the Freiwald at a depth of about 55 fms. With a view of developing these mines in the most practical manner, the present proprietor is engaged in sinking a new main winding shaft, so as to make the Leier Stolln the main hauling way of the mine; this shaft is now down 20 fms. and 25 fms. more are necessary to attain the adit level, while the adit itself must be driven some 220 fms. up to the shaft. By this means a magnificent and almost virgin mine will be opened up, yielding ore of far richer quality than now extracted from the Sauberg. The Greifencreek yields a never-failing supply of water, which is conducted to both mines by an artificial trench—the Rohrgraben—driving by means of water-wheels the crushing, stamping, dressing, and washing machinery, and finally furnishing the necessary power at the smelting works in the Ehrenfriedersdorf Valley by means of a turbine.

The tin from these mines, from its excellent quality, finds a ready market in Saxony, Prussia, and Austria, while the arsenic and sulphur products are highly remunerative, more especially as arsenic is cheap and abundant. Undoubtedly there is a splendid future before these mines, and it is confidently believed that under the



fol and judicious management they will return a handsome dividend upon the large and necessary expenditure that has been and has still to be incurred.

#### THE LEAD MINES OF FLINTSHIRE AND DENBIGHSHIRE.

It is a proverb that history repeats itself, which is not inapplicable in the close imitation of events and circumstances in some of the most famous lead mines in the above counties. Some of our readers may not be aware that the metalliferous bearing rocks in question range from Talargoch southward to Minera and beyond, in which are situated some of the richest lead mines in the world—which in Flintshire alone for a long period of years produced the enormous quantity of 30,000 tons annually. In a district so famous it may not be uninteresting to enumerate a few facts and incidents in the history of one or two of the oldest and most celebrated to this day. Talargoch, at the northern extremity, has been rich at intervals for centuries. The main lode in this mine intersects and, as it were, cuts in two the carboniferous rocks and chert from the slate to the coal measures. An extraordinary upthrow of over 150 yards on the heading or footwall has given it access to all the bearing strata, feeders, and cross-courses, hence the vast deposits that have been brought to light by successive owners during the last 300 years. The circumstances above are so exactly similar in the Great Minera and the Gwernymynydd, excepting only that the latter is comparatively in its infancy, that it would be simply a repetition to describe. One other remarkable feature of the most celebrated lodes in this range is the conformation of the surface on their backs, showing the great break through from the coals to the slate; and we would draw attention particularly to Gwernymynydd and Cathole (the same lode) as an illustration of our meaning. This mine has been enormously rich at its western extremity, there being one continuous run of ore of great width and richness of 400 yards in length worked into water. Such was also the case at the celebrated Minera before the last successful operations, previous to which it had been abandoned for years, and was said to be exhausted. Skill and capital, however, have shown that over 100,000 tons of lead ore, and over 600,000 profit, were still there, which has since been realised. Gwernymynydd is, from the most reliable information, about to repeat this wonderful success. Water only stands in the way of realising in depth the ore runs mentioned, the development of others, discovered in whole ground between Cathole and Gwernymynydd, those partially worked in the flat measures and chert, and the chances in a fine masterly lode north of and parallel to the one in question. 30,000 tons has already been well spent to that end, and about a similar sum is about to be expended in completing the works so far advanced by the late company, which must inevitably secure a bright future.

#### REPORT FROM CORNWALL.

Dec. 12.—Hopes are doomed to be disappointed in one way or another, however confidently or with however much of reason they may have been entertained. It is probably too late now to expect that the last fall in the tin standard will be more than recovered, if indeed that recovery takes place ere the month and the year comes to a close. None the less, however, for this unlucky backward movement do we retain our confidence in the prospects of the immediate future of the prices of tin and of our tin mines. The tide of prosperity, for which we have so long been looking, is only delayed, not turned back, and again it is the waiters who are wise.

The stoppage of the West of England and South Wales District Bank will not affect Cornwall directly; but it will certainly have an indirect adverse influence. We say stoppage in preference to failure, because there is no doubt whatever that the business of the bank was properly conducted, and was essentially sound. What has brought about this unfortunate result is first the shaking of confidence in joint-stock banking caused by the disgraceful revelations in connection with the City of Glasgow Bank, and secondly the setting afloat of certain unfounded rumours, which appears to have been partially at least dictated by motives of revenge, because the bank did not choose to allow a customer to use them as he pleased. Hence a run and thence the stoppage. There were no branches in Cornwall, but there were several in Devon, and the business relations of Cornwall with Devon, and still more with South Wales, where the bank enjoyed an unabated confidence for years, must have their untoward effect.

It is amusing to find the silly folk who were so anxious to sell in South France a few days since now equally anxious to buy. If they only injured themselves by their folly it would not matter much—they deserve it; but the worst is that all these unnecessary panics tell against a mine; and the harm thus done is not compensated for by the advantage to the wide-awake, who are ready to relieve their neighbours of their too burdensome shares, on what may be regarded from the buyer's point of view as very reasonable terms. Capt. James is to be congratulated on the speedy way in which the effects of the explosion were repaired.

It does not appear likely that the celebration of the Davy Centenary will come to much. The Penzance Town Council are considering the matter; and the exhibition of scientific apparatus which Mr. J. H. Collins and Mr. A. K. Barnett have in hand cannot take place till next month. So unless the "memory of Sir Humphry Davy" is drunk in solemn silence, which can be arranged on the very smallest notice, it is perfectly clear that the celebration of his centenary will neither come off on the day of the month on which he was born nor in the centenary even of the year. Nothing like taking time by the forelock in these matters, for if such a thing is worth doing at all it is certainly worth doing well.

#### REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Dec. 12.—I am much obliged for the explanatory letter of Capt. Mitchell relative to the deep driving under the great open-cast of the Parys Mountain Mines. The answer to the enquiries made is clear and straightforward, and one that other mine managers may do well to copy when they are asked simple civil questions. The prospectuses and reports of the South Cambrian Mines are in circulation. One cannot but wish this mining enterprise well, but it is not premature to trade upon the reputation of the Cambrian Mines, and it is not unminging like to assume that one lode must be good because it runs parallel to another that is? Roman Gravels Mine leads the way in Shropshire, that is as far as we know, for little or nothing is heard of Snailbeach these late years. From the yearly mineral statistics, however, we learn that this mine stands highest in the sale of ore. A good many other mines of this region are doing fairly well in themselves, and if lead ore fetched a better price, and they were not burdened with such immense sums as purchase-money, they would be commercially successful.

The decline of the slate trade is very rapid, although we may hope that, like a rapidly falling barometer, it will soon as rapidly rise; at present, however, the outlook is gloomy. The men at the Llangollen slate and slab quarries are only working three days a week. A good number of the men at the Penarth Slate Quarry, near Corwen, have been discharged, so have the men from the Arthor Quarry, near Barmouth. There is hardly a slate quarry now in work on the south side of the Barmouth estuary. A further reduction of 10 per cent. in the wages of the men being imminent in Carnarvonshire, the Quarrymen's Union have issued a circular to the men, pointing out that even with this reduction added to the 20 per cent. recently submitted to, the men's wages would still average as follows:—Quarrymen per month, 6l. 4s.; miners, 5l. 8s. 6d.; labourers, 5l. 2s.; day labourers, 4l. 12s. 6d. Not bad wages in these bad times. Major Mathew, the late proprietor of the Rhiwrydhir Slate Quarry, Festiniog, has had a presentation from his neighbours of a handsome silver tray and cup on the occasion of his removal from North Wales to England. Mr. Henry Dennis, who has been a successful engineer in the Wrexham district, has also been presented with an oil painting of himself, and Mrs. Dennis with a timepiece, by their friends and assistants, on the occasion of their removal to their recently erected mansion of New Hall, near Ruabon. Mr. Dennis is the engineer of the Westminster and Wrexham and Acton Collieries, of the Snailbeach, Minera, and

Llangynog Lead Mines, and of numerous other mines, works, and quarries in the district. He is a Cornishman, and began his career with Messrs. John Taylor and Sons. Arrangements are reported to be nearly complete with a contractor for the construction of the railway from Ruthin to Cerrigydruidion. This line, if made, will open up what is now the most inaccessible part of North Wales.

The signs of increasing distress among the mining population, especially that of the colliery districts, are everywhere apparent. Gangs of 20 colliers or more are drawing wagon loads of coal about the country and begging. A large proportion of the population is on the verge of extreme poverty, and soup kitchens and other methods of relief are being devised. Some of the best flour mills are only running three days a week, and beef, mutton, and pork, with all kinds of farming produce, are slow of sale at low rates in the markets.

The boring of the deep well at Bootle, Liverpool, for the supply of water is finished, and may be regarded as an engineering success. The hole is 26 inches diameter for a depth of 1000 feet, and 20 inches diameter for another 300 feet. Starting in the Keuper beds of the New Red Sandstone it has ended in the pebble beds near the base of that formation. Situated midway between the Flintshire and Lancashire coal fields, the coal measures being doubtless continuous underneath, the boring has revealed a thickness of New Red Sandstone double that which was anticipated. Great expectations are entertained of the quantity of water derivable from this well, but doubtless the quality will be hard.

#### REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Dec. 12.—The collieries which are raising house coal are meeting with a large demand, for the existing severe weather has told in their favour considerably. Prices are firm. Up to the present the Dudley and Tipton coalowners, together with the great Sandwell Park Colliery Company, have been most benefited by the winter season, as the supply from Cannock Chase has been shut up. Now, however, the Cannock Chase owners are setting their machinery to work again. A fair number of pit companies have resumed work upon the understanding that their wages shall be regulated by the terms which are ultimately decided upon in settlement of the strike. Whether these terms will be a drop of 3d. per day, or whether the 11 rate of wages will be confirmed, is uncertain. The attempt of the masters to increase the hours will be wholly unsuccessful. The pig-iron trade gets worse and worse; only about 38 furnaces are now blowing. Bad as trade has now and again been in years gone by it was never so bad as now, for in former periods of depression products could be sold at a price, but now they cannot be got rid of at all. I hear this week of stocks of pigs at makers' furnaces of unprecedented size. It would now seem that the wages notice of the New British Iron Company for the termination of contracts is confined to their blast furnace hands, and to those of their colliers whose labour was necessary to the production of the coal used in the one blast-furnace which they have for some time been solely blowing, and which has now been put out. Their finished ironworks and their other collieries they are keeping on. Right and left similar wages notices are being given by masters with a view to decrease production, and the firm of Messrs. Noah Hingley and Sons, Harts Hill, Dudley, may be mentioned in this connection. Orders for finished iron are increasingly scarce, and less work is doing at the mills and forges all round.

The ironworkers are pursuing a ridiculous policy touching the new weights and measures regulations. At a meeting of the Wages Board held in Birmingham on Monday the employers moved a resolution that as the number of pounds to the ton would under the new law be reduced from 2400 to 2240 lbs. a corresponding reduction should be made in the price per ton paid to the operatives. The men's representatives refused to accede to any corresponding reduction in wages. The employers intimated they were unable to make any advance on the present rate of wages, and the Board then separated. Practically the men's conduct is asking for an advance of 6d. per ton. That they will get what they want is altogether unlikely. Their unreasonable-ness at a time like the present is certainly surprising.

Messrs. Jabez and James Griffiths, coalmasters, West Bromwich, formerly of the Denbigh Colliery, Tipton, have failed, with liabilities amounting to 4000l. Francis Russell Harley, coal merchant and engineer, Horsley Fields, Wolverhampton, has also suspended, with liabilities 800l. Joseph Jewkes, iron merchant, Wolverhampton, after his affairs had been further investigated in the County Court there, was on Monday allowed to pass his examination unopposed.

Trade in North Staffordshire is without any revival. The ironstone miners employed by the Chatterley Iron Company have resumed work at the 10 per cent. drop, and the blast-furnacemen of the same firm have also submitted to reduced remuneration.

#### TRADE OF THE TYNE AND WEAR.

Dec. 11.—There is a little improvement in the Coal Trade here, and those works producing best steam and house coals are fairly employed. The price of coal continues comparatively low; best steam coal does not realise more than 8s. 9d. per ton, and Durham steam coal 7s. 6d. per ton. Only best house coals realise 10s. per ton, and all other coals of lower class have not improved in value. In Durham colliery coal works are still being closed. The men at the Boyne Collieries have got notice of the intention of the owners to close the works shortly. There is some hope that the Hebburn and Wardley Collieries will be started again shortly, the men having offered to go in at reduced rates. The return of the accountants under the sliding scale arrangement in Durham shows that the average price of coal is a fraction less than 4s. 8d. per ton. The minimum rate of wages under the agreement had already been reached, but this only shows that the minimum had been placed too high, and unless some improvement takes place shortly a further reduction by the Durham Miners' Association is inevitable. It must also be noticed that many of the mineowners who are not members of the association have already made reductions on their own account. The coal and other trades here have been much retarded the past few days, owing to heavy falls of snow blocking up the branch railways and roads. A wrought-iron sleeper has been patented by Mr. Charles Wood, and the North-Eastern Railway Company are about to try this sleeper in a section of their line near Middlesbrough. Hopkins, Gilke, and Co. will roll those sleepers, and, of course, the experiment will be watched with considerable interest. Should this sleeper prove to be successful it may lead to an important improvement in the manufactured iron trade.

The arbitrators, Mr. Edward Williams and Mr. Lloyd Jones, have met and arranged for the appointment of an umpire. Mr. J. G. S. Lefevre, the member for Reading, has accepted the office, though no appointment has yet been made by the honourable gentleman as to when the arbitration shall take place.

We understand that the whole of the men employed by Mr. W. B. Beaumont, M.P., at his lead mines and works in Allendale, and also at Allenheads, have received notice that their employment will be discontinued on the 23rd instant. A large number of men were discharged some few months ago, and the notice we have mentioned affects the remainder.

The condition of the iron trade was generally considered less satisfactory at Middlesbrough on Tuesday, though the quotations remained nominally about the same, the business done was, however, very limited; merchants are offering No. 3 at 35s. 6d., and in some cases at less, for forward delivery, as they anticipate that the market will later on tell more in their favour than it has hitherto done. The makers quote differently according to their positions whether they are sold or not. Those wanting to do business do not ask more than 39s. 6d. to 40s. No. 1; 39s. No. 2; and 35s. 6d. No. 4, for less commission. The merchants endeavour to cheapen these rates, and succeed in some instances. The shipments of pig metal to Scotland have been better within the past week. They in fact amounted to nearly 1000 tons in excess of the deliveries for the corresponding period of 1877. This would rather go to show that the Cleveland makers are not losing so much ground in the competition with Scotland as was expected, though the trade between the two districts is very keenly carried on. The foreign shipments have been

less, and it is held that stocks will very largely increase during the winter months, especially as they advanced by above 15,000 tons last month. The winter is expected to be a hard and severe one. The arbitration arrangements are being pushed on for settling the wages question in the finished iron trade. The manufactured iron trade is, however, slack. The forthcoming returns, giving the production and prices for last quarter of finished iron, are expected soon, and will be looked forward to with interest. The plate manufacturers appear to be fairly employed where specifications are not held back, but there is not much promise for the winter's work beyond the end of the year. The price of plates is about 5l. 17s. 6d.; bars are, for ordinary qualities, 5l. 5s.; and angles 5l. 5s. to 5l. 7s. 6d., less 2½ per cent. The founders appear to be pretty fairly employed, with few exceptions, and some of them have work which will last for a length of time. Coals and coke are unaltered.

#### REPORT FROM DERBYSHIRE AND YORKSHIRE.

Dec. 12.—Business is still very bad in all the iron districts in Derbyshire; a large number of men are totally unemployed, and are dependent on the fund that has been raised in Chesterfield and the district for their relief. Ironmasters do not appear to force their material into the markets with the same energy that they did, so that the diminished production is just as favourable to them as the larger one. The foundries are far from being busy, even with the decrease in the number of hands, pipes, pillars, cylinders, and pump castings are still in but moderate request. The Bessemer makers are as busy as ever, being principally engaged on orders for Indian railways. Coal for household purposes is now in much better request than it has been for a long time, and there has been a marked increase in the out-put of late from the leading collieries. The London coal trade of late has become more than usually active, and the Midland Railway during last month carried from Derbyshire a much larger tonnage to the Metropolis than during any previous month in the annals of the Midland coal trade. Steam coal, however, is very quiet, and the same is the case with respect to other qualities as well. With the increased business doing, however, prices at the pits do not appear to advance, so that when profits are made they are remarkably small indeed. In Sheffield there has during the last few days been a slight improvement in several branches, more particularly in fine qualities of cutlery and silver plated and white metal goods. In the other departments, however, there has been no change. The Bessemer mills are running much as usual, and there is a fair amount of business being done at the ship and boiler plate mills, but heavy armour plates are quiet.

In South Yorkshire there is just now some dissatisfaction on the part of the miners, as their employers have announced that they cannot carry on much longer unless the men meet them in their difficulties by submitting to a reduction of 12½ per cent. on their wages for even then, it is stated, they would be barely paying expenses. During the summer months scarcely any coal mine was worked without incurring a loss, and the owners now think that the time has arrived when they should be placed in a position to at least meet expenses. The trade is evidently better than it has been, and the demand for house coal tolerably good; but there does not appear to be any reason why business should be carried on entirely for the benefit of the workmen. The masters, however, have shown every disposition to discuss the matter with their employees, and have requested a deputation from the Association to meet them. It is, therefore, only reasonable to believe that the trade will in no way be disturbed, but that an arrangement will be come to, so as to prevent a strike or lock-out.

Not a week passes without some illustration of the fact that a very large percentage of mining accidents may be included in the preventable class. At an enquiry on the body of a miner who met with his death at one of Lord Vernon's pits through the cage in which he had just ascended beginning to descend again before he could leave it, owing to the catches not being put down, the banksman being absent. The engineman admitted that "in winding coal they always had to drop the cage on the catches, but when men came up this precaution was not always taken." The jury censured the engineman and the banksman, and concurred in the recommendation of the Government Inspector that self-acting catches should be used. Mechanical contrivances are evidently more to be trusted than the care and discretion of those who were employed about the pit in question.

#### REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

Dec. 12.—A most serious commercial disaster has occurred to this district. The West of England Bank, which has many branches in South Wales, and which was, to a great extent, the bank of the district, has suspended operations. There had been ugly rumours floating about, but so persistently had these been contradicted that it was a matter of surprise when the local morning papers gave the news that the bank had been obliged to suspend operations. There had been a "run" on the bank, however, a very strong one—such, in fact, as no bank could withstand, and hence the collapse. Comparatively speaking, there are but few shareholders in the district, so far as at present can be ascertained. The feeling on the part of depositors began to soon cool down, and no doubt they will get their money in full after a time; and it is this waiting which will seriously inconvenience many. Some believe that the bank's difficulties commenced from the time of the Fothergill affair, and no doubt the depression in the coal and iron trades has had a prejudicial effect. There are said to be over 400,000l. locked up, which it will be, to say the least, exceedingly difficult to realise in these depressed times. In the Newport branch is the amount sent in to the Newport committee of the Abercrombie relief fund; and the Cardiff committee have had to come forward and place at the disposal of the secretaries of the central committee a sum of money to go on with. The National Provincial Bank and the London and Provincial have generously given all reasonable assistance to the trading public.

It may be added, with reference to the West of England Bank, that there is a talk of a reconstruction scheme being carried out.

The Aberdare and Plymouth Iron Company (Limited) have held a meeting for the purpose of borrowing from the B debenture-holders a sum not exceeding 115,000l., of which 70,000l. may bear interest at the rate not exceeding 8 per cent. per annum, and the remainder at not more than 5 per cent. per annum. The money is required for the purpose of developing and improving the colliery property of the company. The meeting (held yesterday in London) was a private one, but it is understood the propositions submitted were agreed to.

Allusion was made last week to a probable application for an extension of the Rhymney Railway to Merthyr and Aberdare. It is now stated that the directors are not unanimous on the point. A majority of the board are, however, it is said in favour of the scheme; while the minority, who think otherwise, are supported in their views by a good many of the shareholders.

To turn to the condition of the staple trades, the iron industry presents an appearance of depression before unknown. Various matters have, of course, contributed to bring about this state of things, prominent among which is the falling off in the demand for railway iron. Very little of this commodity, comparatively speaking, is now turned out in this district, and during the last few weeks iron clearances have been very small, and mainly to Malta and Porto Torres, to which latter place 1000 tons went. During the last week or so no orders of any magnitude have been placed in the district, and even those which are secured too frequently do not leave the slightest margin for profit. Iron rails are selling at the works at some shillings less than 5l. per ton. Bars are rather quiet. Some of the works are barely kept on the move, and it is feared that as the winter progresses less work still will be done. Bossem steel rails are in fair request, and at late rates. It is satisfactory to be able to state that the tin-plate trade still shows an improvement; prices continue to maintain a slight advance, and the works are well employed four days a week.

The coal industry shows no material alteration. There is the usual demand for coal for shipment, and on behalf of France and the Mediterranean ports there is a good enquiry. The same keen



Oct. 15.—Roasted ores ready for vats, 21.79 per ton of 2000 lbs.  
on dump stuff can be done until stocks are reduced.



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THE WEEK.

SATURDAY, DEC. 7.—The markets opened flat, and closed without recovery, mainly because of the difficulties of a bank to which reference was made yesterday. The concern was named to day as the West of England and South Wales District Bank, having a nominal capital of 1,000,000. In 200 shares, 15s. paid, and being established in over 40 different towns in Wales and the West of England. It is an unlimited concern. The greater portion of the stock is under-secured. It is expected the circular announcing the stoppage will be issued on Monday. Why this bad business should affect foreign stocks is not very clear, but the market has fallen to 80½, and Preference to 70½.

MONDAY.—At first it was stated that the shareholders of the West of England Bank would only lose their paid-up capital, and that business would soon be resumed. Now it is thought they must be prepared to meet a call of 5s. per share. The National Provincial Bank is bidding for its business, and it must soon pass away into other channels. It has been stated that the losses caused by this failure exceed the sums subscribed for mining since 1860. This fact, however, will not change the popular opinion that banks always pay as an investment—mines never. All the gulls that swallowed up the money of unfortunate, the wit of man never devised anything equal to an old established bank with a good reputation and unlimited liability. London and Westminster, London and County, and City Bank fell 2s. to-day, and it would be very strange if there was not a much greater reduction in quotations. A week ago it was pointed out that a fall was impending in Dover, A. and Brighton, A. Both stocks are now down from 2 to 1 per cent.

TUESDAY.—Brighton, A. dropped from 13½ to 13¼; within a fortnight the fall has now amounted to over 1 per cent. Dover, A. gave way 1s. (12¼ to 12½). Bank shares were very heavy. Westminster fell further 2s., closing no better than 40 to 41; this is a fall of nearly 10s. from the highest reached during the present account. There was a similar reduction in National, and London and County. City Bank shares were dealt in as low as 11½. From the report issued by this bank to-day it appears that the City of Glasgow Bank will only effect it to the extent of some 15,000. Mining shares were little affected by the semi-panic in other securities. Richmond, 10½ to 11; Eberhardt, 3 to 3½; Frontino, 2 to 2½; Espanga, 10s. to 11s. Unified were forced down to 49, and the Preference to 64.

WEDNESDAY.—Rates for continuing stock to day were so very heavy that the markets were unable to show any important rally. To a great many the stiff quotations charged were a puzzle, considering how little stock is now left open at a rise. The charge on Dover, A. and Brighton, A. was not less than ¾ per cent.—i.e., 7s. 10s. on each 1000s. stock. On North Eastern, North British, and Great Western the rate was 12s. 6d. Egyptian and Turke paid from 7 to 10 per cent.

THURSDAY.—Last account Unified were continued at 52½; this time it was 54½; the Preference have similarly fallen from 71½ to 68½. The greatest drop has been in Brighton, A. and here very large differences will have to be paid to-morrow. The fall has been 7s. from 138½ to 131½. Dover, A. have receded from 12½ to 12¼, and Caledonian from 98½ to 95½. There was a rise of 1 to 2 in the leading banks. In railways the chief feature was a heavy decline in Chatham Preference.

FRIDAY (Opening).—There is a rise of ¼ in Brighton, A. (132½, 132½), and one ½ in Dover, A. (122½ to 123½), but otherwise the markets are inclined to dullness. Egyptian Unified can still be had at 49½, and the Preference at 69½. Bank shares maintained yesterday's rise, City being 13 to 14; Union, 34 to 36; Consolidated, 6½ to 6¾; and Westminster, 51 to 53. Consols are unchanged. Batham Preference have fallen ¾. Rookhope, ¾ to ¾; Penrith, 3s. to 3s.; Port Pedro, ¾ to ¾; Port Phillip, 10s. to 12s. 6d.—Two o'clock.—The settlement nearly concluded. There have been large deliveries of stock. Consols have risen ½, so have Unified. Richmond, 10½ to 11; Eberhardt, 3½ to 3¾; Kapanga, 10s. to 11s.; Adamhill, 1 to 1½; Leadhills, 2 to 2½; Pateley Bridge, 2½ to 3; Eney, 10 to 12; Vain, 1½ to 1¾; Farsy Mountain, 1½ to 1¾; Devon Consols, 1½ to 1¾; Glenroy, ¾ to ¾; West Chiverton, 1½ to 2. Tin is slightly firmer. In railways, Sheffield have fallen ¾ (73½ to 74), and Caledonian, ¾ (95½ to 95½).

—Four o'clock.—The markets close flat, the New Egyptian Loan being again noted 1½ to 1¾ dis. Unified have dropped to 48½. Brighton, A. from being 12½, have receded to 131½. Brighton Aquarium, 7 to 7½; Royal Aquarium, 4½; Hudson's Bay, 10½ to 10¾; National Discount, 8½ to 9; General Credit, 4½ to 5 Colorado, 1½ to 2; Chapel House Colliery, 2½ to 3; Alltami, 2½; Newport Abercrom, 4 to 4½; Bilson and Crump, 2 to 3.

FERDINAND B. KIRK.

LEAD ORES.			
Mines.	Tons.	Price per ton.	Purchasers.
Dec. 9—Wye Valley	40	£ 9 0	Nevill, Druce, and Co.
— ditto	200	10 1 0	Walker, Parker, and Co.
— ditto	50	10 1 6	Adam Epton.
— ditto	50	10 2 0	Nevill, Druce, and Co.
— ditto	50	10 1 0	ditto
— ditto	50	10 3 6	Quirk, Barton, and Co.
— ditto	100	10 8 6	ditto

BLENDED.			
Mines.	Tons.	Price per ton.	Purchasers.
Dec. 11—Talargoch	50	£ 3 11 0	—
— ditto	50	3 7 6	—
— ditto	50	3 6 0	—
— ditto	50	3 3 0	—
— ditto	75	2 12 0	Villiers Spelter Co.
— ditto	75	2 11 0	Kenrick and Son.
— ditto	75	2 11 0	ditto

COPPER ORES.			
Mines.	Tons.	Produce.	Price.
Dec. 11—Talargoch	50	£ 25 4	—
— ditto	50	5 3 8	—
— ditto	50	7 12 6	—
— ditto	50	4 12 6	—
— ditto	77	9	—
— ditto	77	4 11 6	—
— ditto	91	9½	—
— ditto	91	4 17 6	—
— ditto	90	4 16 6	—
— ditto	90	5 0 0	—
— ditto	90	4 10 0	—
— ditto	77	4 0 6	—
— ditto	77	3 10 0	—
— ditto	77	4 0 6	—
— ditto	83	4 0 6	—
— ditto	83	4 0 6	—
— ditto	83	4 0 6	—
— ditto	88	5 0 0	—
— ditto	78	5 10 6	—
— ditto	6	7 8 0	—

TOTAL PRODUCE.			
Mines.	Tons.	Produce.	Price.
Dec. 11—Talargoch	770	£ 2362 10	—
— ditto	172	256 5	—
— ditto	170	1497 10	—
— ditto	100	882 10	—
— ditto	40	224 17 6	—

COMPANIES BY WHOM THE ORES WERE PURCHASED.			
Mines.	Tons.	Amount.	
Copper Mines Company	343	£ 1,750 7 0	
P. Grenfell and Son	23	362 5 0	
Nevill, Druce, and Co.	11	306 9 0	
Williams, Foster, and Co.	862	4,267 8 6	
Mason and Elkington	270	1,209 0 0	
Charles Lambert and Co.	5	108 0 0	
Swindland and Co.	237	1,561 0 0	
Landore Copper Company	175	1,363 2 0	
Total	1918	£10,908 11 6	

TOTALS AND AVERAGES.			
Wholesale	21 cwt.	Produce.	Per unit.
Dec. 11, 1878.	10½	£ 18 10	11s. 7d.
Standard.			£ 17 11 0

The Master of the Rolls has appointed Mr. B. P. Daniels (Good, Daniels, and Co.) provisional official liquidator of the Ruthwaye Barytes Company (Limited).

In the Court of the Vice-Warden of the Stannaries. Stannaries of Devon.

IN the MATTER of the COMPANIES ACTS, 1862 and 1867, and of the TEIGN VALLEY LEAD AND BARYTES MINING COMPANY (LIMITED).—By an Order, made by the Vice-Warden of the Stannaries, in the above Matter, dated the 11th day of December, 1878, on the petition of Frederick Whinney, of Old Jewry, in the City of London, Public Accountant, and Thomas Andrew, of the City of Exeter, Public Accountant, claiming to be creditors of the above named company, IT WAS ORDERED that the said Teign Valley Lead and Barytes Mining Company (Limited) SHOULD BE WOUND UP by the Court under the provisions of the Companies Act, 1862. ROBERT DOBELL, JUN., Solicitor, Truro. (Agent for Messrs. Halse, Trustram, and Co., 61, Cheapside, London, E.C.) Solicitors for the above named Frederick Whinney and Thomas Andrew.) Dated Truro, this 12th day of December, 1878.

In the Court of the Vice-Warden of the Stannaries. Stannaries of Devon.

IN the MATTER of the COMPANIES ACTS, 1862 and 1867, and of the TEIGN VALLEY LEAD AND BARYTES MINING COMPANY (LIMITED).—The Vice-Warden has, by an Order made in the above Matter, bearing date the 11th day of December instant, APPOINTED JOHN HENRY HAMLEY, of Truro, within the said Stannaries, an Officer of the said Court, to be absolutely the OFFICIAL LIQUIDATOR of the above named company. FREDERICK MARSHALL, Registrar. Dated Registrar's Office, Truro, this 12th day of December, 1878.

In the Court of the Vice-Warden of the Stannaries. Stannaries of Devon.

IN the MATTER of the COMPANIES ACTS, 1862 and 1867, and of the TEIGN VALLEY LEAD AND BARYTES MINING COMPANY (LIMITED).—Notice is hereby given, that ALL CREDITORS of the above named company are required, on or before the 24th day of December instant, to SEND IN their NAMES and ADDRESSES, and the AMOUNTS and PARTICULARS of their CLAIMS, to JOHN HENRY HAMLEY, the Official Liquidator of the said company, at the Stannaries Court Office, in Truro, within the said Stannaries. FREDERICK MARSHALL, Registrar. Dated Registrar's Office, Truro, this 12th day of December, 1878.

BY ORDER OF THE EXECUTORS OF THE LATE JOSEPH SMETHURST, DECEASED.

MR. WILLIAM McPHERSON WILL SELL, BY PUBLIC AUCTION, at the Mire Hotel, in the City of Manchester, on Tuesday, the 17th day of December, 1878, at Six for Seven o'clock in the evening:— Lot 1.—THIRTEEN fully paid-up SHARES of £10 each in the SWANSEA TRAMWAYS AND IMPROVEMENTS COMPANY (Limited). Lot 2.—FOUR fully paid-up SHARES of £20 each in the ANGLO-MALTESE HYDRAULIC DOCK COMPANY (Limited). Lot 3.—SEVENTEEN fully paid-up SHARES of £10 each in the SOLWAY JUNCTION RAILWAY COMPANY (Limited). Lot 4.—THIRTEEN fully paid-up SHARES of £20 each in the BIRCH GROVE COLLIERY COMPANY (Limited). Lot 5.—TWENTY-TWO fully paid-up SHARES of £10 each in the MYND-DYGARREG AND KIDWELLY RAILWAY AND LIME COMPANY (Limited). Lot 6.—THIRTY SHARES of £10 each in the WARTON LAND COMPANY (Limited)—six fully paid-up, and twenty-four £7 paid up. Lot 7.—THREE fully paid-up SHARES of £100 each in the NORTON IRON COMPANY (Limited), and THREE 2 per cent. PREFERENCE SHARES of £100 each in the same company. Lot 8.—SIXTY-FIVE fully paid-up SHARES of £10 each in the ANGLO-INDIAN COTTON COMPANY (Limited). Lot 9.—THIRTEEN fully paid-up SHARES of £20 each in JOHN ELCE AND COMPANY (Limited). Lot 10.—SEVENTY-SIX fully paid-up SHARES of £5 each in the GOOD HOPE MILL COTTON SPINNING COMPANY (Limited). Lot 11.—THREE GWENDRAETH VALLEYS RAILWAY COMPANY'S BONDS of £1000 each, with 98s. fully paid-up SHARES of £10 each in the same company added. Further particulars may be had on application to the Auctioneer, 55, Market-place, Manchester; to GEORGE WILLIAMSON, Accountant, No. 13, Norfolk street, Manchester; and to SLATER and TURNBULL, Solicitors, 22, Cooper-street, Manchester.

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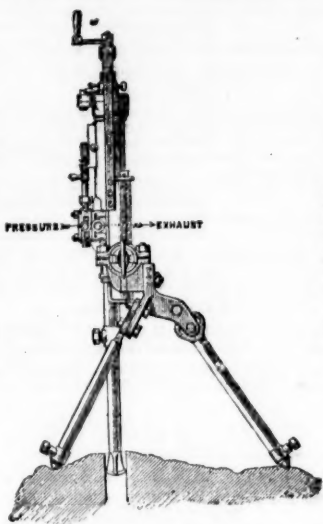
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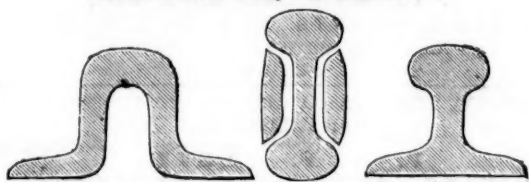
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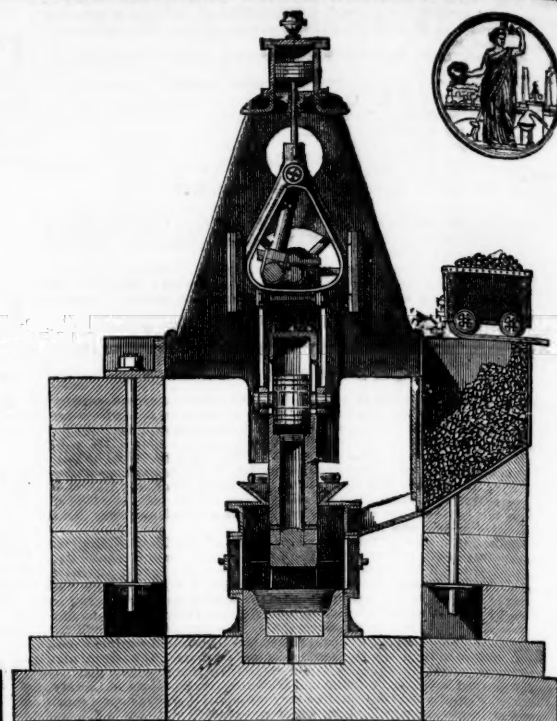
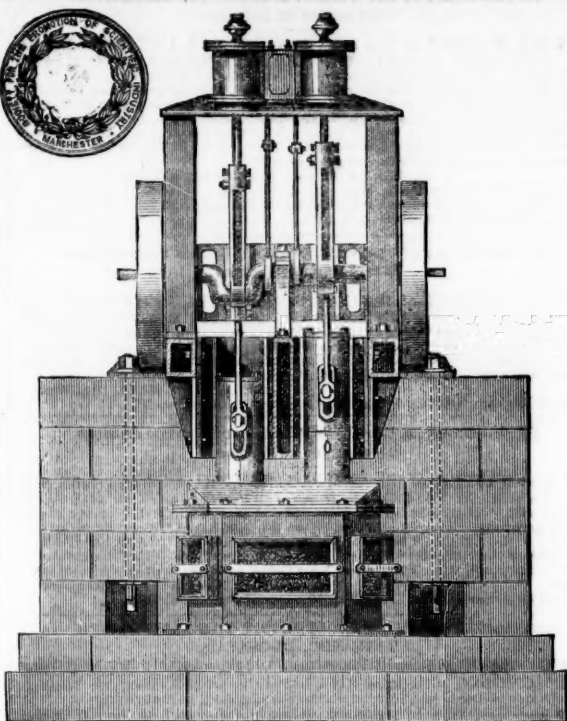
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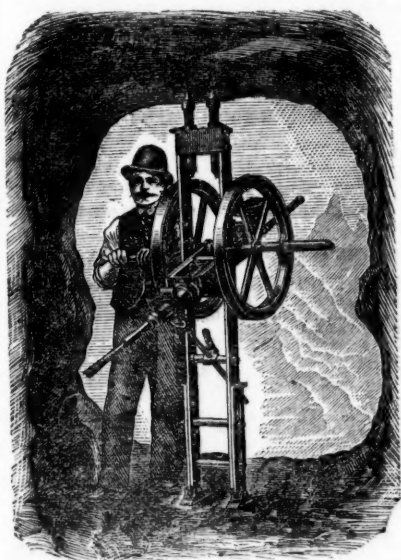
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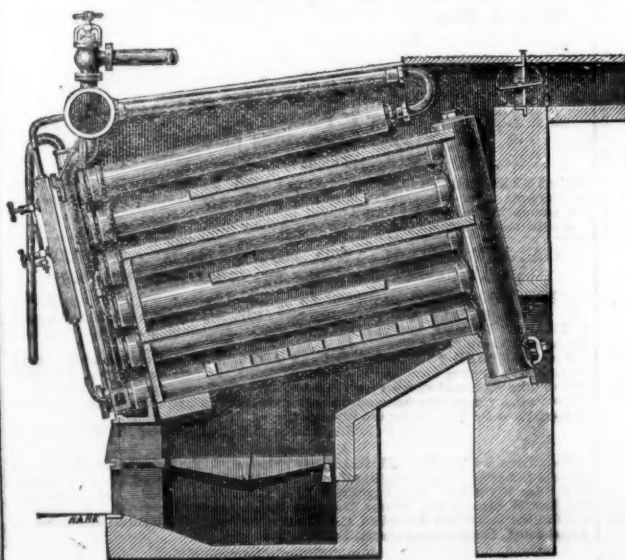
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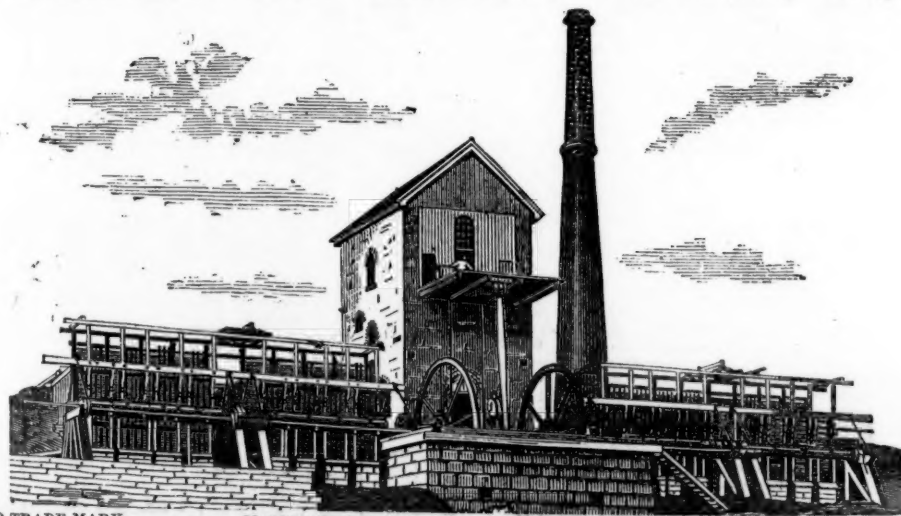
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IRON AND COAL COMPANIES.

BRITISH DIVIDEND MINES.									
Shares.	Mines.	Par.	Last wk.	Clos. pr.	Total divs.	Per sh.	Last wk.	Clos. pr.	Notes.
2000	Bryn Alyn, c. s. i. Denbigh	10 00	—	—	0 7 0 0	0 7 0 0	7 0 0	Jan. 1877	
10000	Caron, c. s. i. Cardigan	2 00	—	—	0 4 0 0	0 4 0 0	2 0 0	Oct. 1878	
1000	Carn Brea, c. s. i. Illogan	56 7 6	37	37 3/4	308 0 0	1 0 0	37 3/4	Feb. 1874	
4000	Cashwell, c. s. i. Cumberland	2 10 0	—	—	1 9 0 0	2 0 0	2 10 0	Aug. 1876	
2450	Coalbrookdale, c. s. i. Illogan	25 4 9	2	1 1/2	11 17 0 0	1 6 0 0	1 1/2	Jan. 1872	
1400	Devon Gt. Consols, c. s. i. Tavistock	1 00	—	—	118 15 0 0	5 0 0	1 1/2	July 1878	
4296	Dolomith, c. s. i. Camborne	10 14 10	31	1 1/2	113 1 0 0	5 0 0	1 1/2	Nov. 1878	
5000	East Black Craig, c. s. i. Scotland	5 00	—	—	0 10 0 0	10 0 0	5 00	Feb. 1877	
300	East Darren, c. s. i. Cardigan	32 00	—	—	235 10 0 0	1 0 0	32 00	Aug. 1876	
6400	East Pool, c. s. i. Illogan	0 9 9	—	—	16 13 3 0	1 0 0	0 9 9	Nov. 1878	
40710	Glasgow Carr, c. s. i. [20,000 s. i. p. 10,000 l. s. p.]	1 00	—	—	0 13 10 0	0 6 0 0	1 00	Aug. 1878	
7500	Glossed and Merilyn Cons., c. s. i. Flint	2 10 0	—	—	0 5 0 0	0 5 0 0	2 10 0	Aug. 1877	
6000	Great Laxey, c. s. i. Isle of Man	4 00	—	—	24 5 0 0	0 6 0 0	4 00	Aug. 1877	
618	Gt. Retalack, c. s. i. b. i. Ferranabuloe	8 16 6	—	—	0 1 0 0	1 0 0	8 16 6	Mar. 1878	
6400	Green Hurtle, c. s. i. Durham	0 6 0	—	—	1 18 0 0	0 3 0 0	0 6 0	Mar. 1878	
6000	Grogwinion, c. s. i. Cardigan	2 00	—	—	0 14 10 0	0 10 0 0	2 00	Aug. 1878	
9830	Gunnislake (Olliters), c. s. i. s. i.	8 8 0	—	—	0 13 9 0 0	1 0 0	8 8 0	Oct. 1876	
60000	Holmbush, c. s. i. s. i. Callington	1 00	—	—	0 4 6 0 0	0 6 0 0	1 00	Sept. 1877	
2400	Isle of Man, c. s. i. Isle of Man	25 00	—	—	82 5 0 0	0 10 0 0	25 00	Feb. 1876	
20000	Leadhills, c. s. i. Lanarkshire	6 00	—	—	0 15 0 0	0 3 0 0	6 00	Mar. 1878	
400	Lisburne, c. s. i. Cardigan	18 16 0	—	—	587 10 0 0	1 0 0	18 16 0	Aug. 1878	
10000	Llanidloes, c. s. i. Montgomery	3 00	—	—	0 9 0 0	0 4 0 0	3 00	Nov. 1876	
3000	Marke Valley, c. s. i. Linkinhorne	5 3 8	—	—	7 15 0 0	0 2 0 0	5 3 8	Jan. 1876	
10000	Melancor Copper, Hayle	2 00	—	—	0 5 0 0	0 3 0 0	2 00	July 1878	
6000	Minera Mining Co., c. s. i. Wrexham	6 00	—	—	67 17 8 0	0 2 0 0	6 00	Nov. 1878	
20000	Mining Co. of Ireland, c. s. i. s. i.	7 00	—	—	28 17 6 0	0 2 0 0	7 00	Jan. 1878	
1024	North Busy, c. s. i. Chacewater	1 14 9	—	—	1 00 0 0	0 5 0 0	1 14 9	Oct. 1878	
1024	North Hendre, c. s. i. Wales	2 10 0	—	—	2 7 8 0	0 5 0 0	2 10 0	June 1876	
30000	Panty Mwyn, c. s. i. Mold (8794 l. s.)	2 00	—	—	0 3 0 0	0 2 0 0	2 00	June 1877	
6000	Pedra an-dra Con, c. s. i. Redruth	0 8 6	—	—	0 9 0 0	0 9 0 0	0 8 6	June 1877	
5000	Pennalls, c. s. i. St. Agnes	3 2 6	—	—	3 13 6 0	0 2 0 0	3 2 6	July 1876	
6000	Pennant, c. s. i. North Wales	5 00	—	—	0 10 0 0	0 6 0 0	5 00	Mar. 1878	
45793	Penrthral, c. s. i. c. s. i. Gwennap	2 00	—	—	0 2 8 0	0 8 0 0	2 00	Nov. 1875	
10000	Prince Patrick, c. s. i. Holywell	1 00	—	—	0 14 0 0	1 3 0 0	1 00	Jan. 1876	
10000	Red Rock, c. s. i. Cardigan	2 00	—	—	0 4 0 0	0 2 0 0	2 00	Jan. 1878	
12000	Roman Gravel, c. s. i. Salop	7 10 0	—	—	7 18 9 0	0 5 0 0	7 10 0	Mar. 1877	
512	South Cardon, c. s. i. St. Cleer	1 50	—	—	744 10 0 0	1 0 0	1 50	Nov. 1878	
6133	South Condurrow, c. s. i. Camborne	1 6 8 6	—	—	4 10 0 0	0 1 0 0	1 6 8 6	Aug. 1878	
12000	St. Harmon, c. s. i. Montgomery	8 00	—	—	0 12 0 0	0 3 0 0	8 00	Aug. 1878	
10000	St. Patrick, c. s. i. s. i. (8000 l. s. issued)	1 00	—	—	0 7 0 0	1 0 0	1 00	Oct. 1878	
4500	South Wh. Frances, c. s. i. Illogan	7 12 4	—	—	37 5 0 0	0 5 0 0	7 12 4	Sept. 1875	
10000	Tauntonville, c. s. i. Salop	6 00	—	—	4 17 0 0	0 5 0 0	6 00	Dec. 1876	
6000	Thurcroft, c. s. i. Pool, Illogan	11 10 0	—	—	50 8 6 0	0 5 0 0	11 10 0	May 1877	
15000	Van, c. s. i. Llanidloes	4 6 0	—	—	23 8 6 0	0 5 0 0	4 6 0	Oct. 1878	
3000	W. Chiverton, c. s. i. Ferranabuloe	12 10 0	—	—	55 10 0 0	0 10 0 0	12 10 0	Feb. 1878	
1783	West Poldice, c. s. i. Day	11 00	—	—	1 19 0 0	0 4 0 0	11 00	July 1876	
512	West Tolgus, c. s. i. Redruth	95 10 0	—	—	32 0 0	1 0 0	95 10 0	Nov. 1874	
20448	West Wheel Frances, c. s. i. Illogan	28 16 3	—	—	8 12 6 0	0 3 0 0	28 16 3	Oct. 1872	
600	West Wh. Seton, c. s. i. Camborne	49 0 0	—	—	446 0 0	0 15 0 0	49 0 0	Apr. 1878	
12000	West Valley, c. s. i. s. i.	8 00	—	—	0 12 0 0	0 3 0 0	8 00	Nov. 1877	
1024	Wh. Eliza Consols, c. s. i. St. Austell	5 13 10	—	—	19 19 0 0	1 11 0 0	5 13 10	Aug. 1878	
2048	Wheel Jane, c. s. i. Kea	5 4 6	—	—	0 8 0 0	0 2 0 0	5 4 6	Oct. 1878	
4998	Wheel Kitty, c. s. i. St. Agnes	5 4 6	—	—	0 8 0 0	0 2 0 0	5 4 6	Oct. 1878	
5500	Wh. Newton, c. s. i. c. s. i. Calstock	1 00	—	—	0 8 6 0	0 2 0 0	1 00	Dec. 1874	
80	Wh. Ovels, c. s. i. St. Just	173 15 0	—	—	629 10 0	0 4 0 0	173 15 0	Sept. 1877	
3000	Wheel Peever, c. s. i. Redruth	7 11 0	—	—	0 15 0 0	0 5 0 0	7 11 0	Nov. 1878	
6000	Wheel Prussia, c. s. i. Redruth	0 5 0	—	—	0 4 0 0	1 0 0	0 5 0	July 1876	
10000	Wye Valley, c. s. i. Montgomery	3 00	—	—	0 10 6 0	0 4 0 0	3 00	Oct. 1878	

FOREIGN DIVIDEND MINES.									
Shares.	Mines.	Par.	Last wk.	Clos. pr.	Total divs.	Per sh.	Last wk.	Clos. pr.	Notes.
35500	Altamir, c. s. i. Spain	2 00	—	—	1 19 9 0	0 6 0 0	2 00	Oct. 1878	
80000	Altamir and Tinto Consol., c. s. i.	1 00	—	—	0 6 3 0	1 0 0	1 00	May 1876	
20000	Australian, c. s. i. South Australia	7 7 6	—	—	1 1 6 0	2 0 0	7 7 6	Oct. 1878	
10000	Battle Mountain, c. s. i. (6240 part pd.)	8 00	—	—	0 10 0 0	10 0 0	8 00	Nov. 1872	
18000	Birdseye Creek, c. s. i. California	4 00	—	—	0 14 0 0	0 2 0 0	4 00	Dec. 1874	
20000	Cape Copper Mining, c. s. i. So. Africa	7 00	—	—	38 2 6 0	17 6 0	7 00	Dec. 1878	
34433	Cedar Creek, c. s. i. California	6 00	—	—	0 18 0 0	0 2 0 0	6 00	June 1878	
85000	Cesena Sul. Co., Romagna, Italy	10 00	—	—	0 13 0 0	0 2 0 0	10 00	Aug. 1873	
15000	Chicago, c. s. i. Utah	10 00	—	—	0 2 8 0	0 4 0 0	10 00	Nov. 1878	
65000	Colorado United, c. s. i. Colorado	8 00	—	—	0 13 6 0	0 4 0 0	8 00	Jan. 1876	
10000	Copago, c. s. i. Chile (220 shares)	16 16 0	—	—	7 11 5 0	0 3 0 0	16 16 0	May 1877	
60000	Don Pedro North del Rey	0 16 0	—	—	9 8 0 0	0 2 0 0	0 16 0	Mar. 1872	
28500	Eberhardt & Aurora, c. s. i. Nevada	10 00	—	—	1 8 0 0	0 3 0 0	10 00	Dec. 1877	
10000	English & Australian, c. s. i. S. Aust.	2 10 0	—	—	2 15 9 0	1 0 0	2 10 0	Mar. 1877	
30000	Flagstaff, c. s. i. Utah	10 00	—	—	4 20 0 0	0 8 0 0	10 00	July 1872	
20000	Fortuna, c. s. i. Spain	2 00	—	—	7 3 2 0	0 6 0 0	2 00	July 1872	
85000	Frontino & Bolivia, c. s. i. New Gran.	2 00	—	—	0 2 6 0	1 8 0 0	2 00	Oct. 1878	
60000	Gold Run, c. s. i. Australia	1 00	—	—	0 2 4 0	0 4 0 0	1 00	Oct. 1872	
68000	Kapunda Mining Co. Australia	1 30	—	—	0 2 4 0	0 4 0 0	1 30	June 1878	
30000	Last Chance, c. s. i. Utah	8 00	—	—	0 14 0 0	0 2 0 0	8 00	July 1872	
15000	Linares, c. s. i. Spain	3 00	—	—	17 10 4 0	2 8 0 0	3 00	Oct. 1878	
80000	London and California, c. s. i. s. i.	2 00	—	—	0 10 0 0	0 2 0 0	2 00	July 1878	
787	Llanidloes, c. s. i. (22 sh.)	8 10 0	—	—	11 6 0 0	1 6 0 0	8 10 0	Mar. 1873	
5000	Mamm. Copperopolis of Utah, c. s. i.	10 00	—	—	0 8 0 0	0 4 0 0	10 00	Mar. 1872	
5000	Mountain Chief, c. s. i. Utah	10 00	—	—	0 4 0 0	0 4 0 0	10 00	Jan. 1872	
10000	Pontigbaud, c. s. i. France	20 00	—	—	26 18 8 0	10 9 0 0	20 00	Sept. 1878	
10000	Port Phillip, c. s. i. Clunes	1 00	—	—	1 11 0 0	1 0 0	1 00	Sept. 1878	
54000	Richmond Consols, c. s. i. Nevada	8 00	—	—	6 11 6 0	10 0 0	8 00	Nov. 1878	
40000	Santa Barbara, c. s. i. Brazil	0 10 0	—	—	0 5 9 0	1 0 0	0 10 0	Nov. 1878	
120000	Scottish Australian Mining Co., c. s. i.	1 00	—	—	15 0 0	per cent.	1 00	Nov. 1878	
80000	Scottish Austral. Mining Co., New	0 10 0	—	—	1 19 0 0	0 1 0 0	0 10 0	Nov. 1878	
12200	Sierra Buttes, c. s. i. California	2 00	—	—	1 19 0 0	0 1 0 0	2 00	Nov. 1878	
14026	S. B. Pumas Eureka	2 00	—	—	2 10 0 0	0 2 0 0	2 00	Oct. 1878	
60000	South Aurora, c. s. i. Nevada	8 00	—	—	2 10 0 0	0 2 0 0	8 00	Oct. 1878	
235000	St. John del Rey (25 stock & multiples dealt in)	275 285	—	—	3 4 0 0	per cent.	275 285	Dec. 1878	
20000	Tolima, c. s. i. (America)	8 00	—	—	0 12 6 0	0 8 0 0	8 00	May 1874	
15000	Western Andes, c. s. i. New Granada	1 00	—	—	0 12 6 0	0 7 1/2 0 0	1 00	July 1878	
21500	W. Prussian (5500 pref. sh. 10l. pd)	10 00	—	—	1 6 0 0	12 0 0	10 00	Oct. 1878	

NON-DIVIDEND FOREIGN MINES.									
Shares.	Mines.	Par.	Last Pr.	Clos. Pr.	Last Call.				
12000	Argentine, <i>c. s. i.</i> Argentine Republic	8 00	—	—	Fully pd				
30000	Bellevista, <i>c. s. i.</i> Peru (210 shares)	5 00	3/4	—	Fully pd				
80000	Blue Tent, <i>c. s. i.</i> California	10 00	—	—	Fully pd				
10000	Buena Ventura, <i>c. s. i.</i> Llanidloes, Spain (22 shares)	0 50	3	2 3/4	Fully pd				
49925	Chautauque, <i>c. s. i.</i> Nicaragua*	2 00	—	—	Oct. 1878				
18000	Condes of Chile, <i>c. s. i.</i>	5 00	3/4	3/4	Fully pd				
20000	Ku. H. Austral. <i>c. s. i.</i> Victoria*	1 00	3/4	3/4	Fully pd				
25 103	Excellor Hydraulic, Washing Co., California*	6 00	3/4	3/4	Fully pd				
10 400	Exchequer, <i>c. s. i.</i> California*	1 00	3/4	3/4	Dec. 1871				
40000	Holcombe Valley, <i>c. s. i.</i> California	1 00	3/4	3/4	Fully pd				
8000	Hortascho, <i>c. s. i.</i> Spain	10 00	—	—	Fully pd				
12000	Hortascho, <i>c. s. i.</i> Sweden	5 00	13	10 12	Fully pd				
19000	Hunter Consolidated, <i>c. s. i.</i> Utah	5 00	3 1/2	3 3/4	Fully pd				
20000	Imperial Brazilian Collieries, Brazil*	10 00	—	—	Fully pd				
7500	Isabelle, <i>c. s. i.</i> California (220 shares)	8 00	—	—	Fully pd				
100000	I. X. L., <i>c. s. i.</i> California*	5 00	—	—	Fully pd				
50000	Javali, <i>c. s. i.</i> Nicaragua*	1 00	3/4	3/4	Oct. 1878				
3500	La Mancha, <i>c. s. i.</i> Newfoundland	2 00	8s.	6s. 8s.	Fully pd				
12000	Laurens, <i>c. s. i.</i> Viscaya, Spain (22 shares)	10 00	—	—	Fully pd				
75000	Malabar, <i>c. s. i.</i> Colombia (87185 issued)	1 18 0	—	—	Fully pd.				
40000	Malpasco, <i>c. s. i.</i> Colombia* (7400 paid shares, fully paid)...	1 00	—	—	Mar. 1876				
12000	Menzenberg, <i>c. s. i.</i> Hanover, Germany*	1 00	—	—	Fully pd.				
4588	New Bonaberg, <i>c. s. i.</i> Germany	5 80	—	—	Fully pd				
64000	New Quebrada, <i>c. s. i.</i> Venezuela	5 00	—	—	Fully pd				
2 0000	New Zealand Kapanga, Coromandel*	5 00	—	—	Fully pd				
3000	Oregon, <i>c. s. i.</i> Oregon, U.S. (preference shares)	5 00	2	1 3/4 1 1/4	Nor. 1876				
50000	Panulillo, <i>c. s. i.</i> Chili* (280000 debentures)	4 00	3/4	3/4	Fully pd				
9 0000	Pestapore, United, <i>c. s. i.</i> Italy*	4 00	—	—	Fully pd				
25000	Pitangui, <i>c. s. i.</i> Brazil (1000 sh. £1 fully paid)	3 00	1 1/2	3/4 1 1/4	Fully pd.				
25000	Placerilla, <i>c. s. i.</i> California	9 60	3/4	3/4	Fully pd.				
50000	Providence and New Rosario, <i>c. s. i.</i> Mexico*	2 00	3/4	3/4	Aug. 1878				
40 000	Ravenscroft, <i>c. s. i.</i> New Zealand; <i>c. s. i.</i> South Australia	1 00	2 1/2	2 1/4	Fully pd				
5 000 000	Rio, <i>c. s. i.</i> Colombia (10000 issued)	0 50	3/4	3/4	Fully pd				
22,131,000	Rio Tinto, <i>c. s. i.</i> Huelva, Spain	1 00	—	—	Fully pd				
000000	Rossa Grande, <i>c. s. i.</i> Brazil (21 shares)	1 00	61	58 00	Fully pd				
300040	Russia Copper, Orenburg and Ufa*	1 00	3/4	3/4	Fully pd				
10000	Silver Plume, <i>c. s. i.</i> Colorado*	10 00	3/4	3/4	Fully pd				
80000	Teocoma, <i>c. s. i.</i> Utah*	1 00	—	—	Fully pd				
451174	United Mexican, <i>c. s. i.</i> Mexico*†	10 00	3/4	3/4	Fully pd				
140000	Utah, <i>c. s. i.</i> Utah*	50 00	8 1/2	2 3/4 3 1/4	May 1878				
500000	Virneburg, <i>c. s. i.</i> Rheinbreitbach, Germany*	5 00	—	—	Fully pd.				
18 000	Yorke Peninsula, <i>c. s. i.</i> South Australia	2 00	—	—	Fully pd.				
548900	Yorke Peninsula, <i>c. s. i.</i> South Australia Preference	1 00	3/4	3/4	Fully pd.				

† Have made calls since last dividend.